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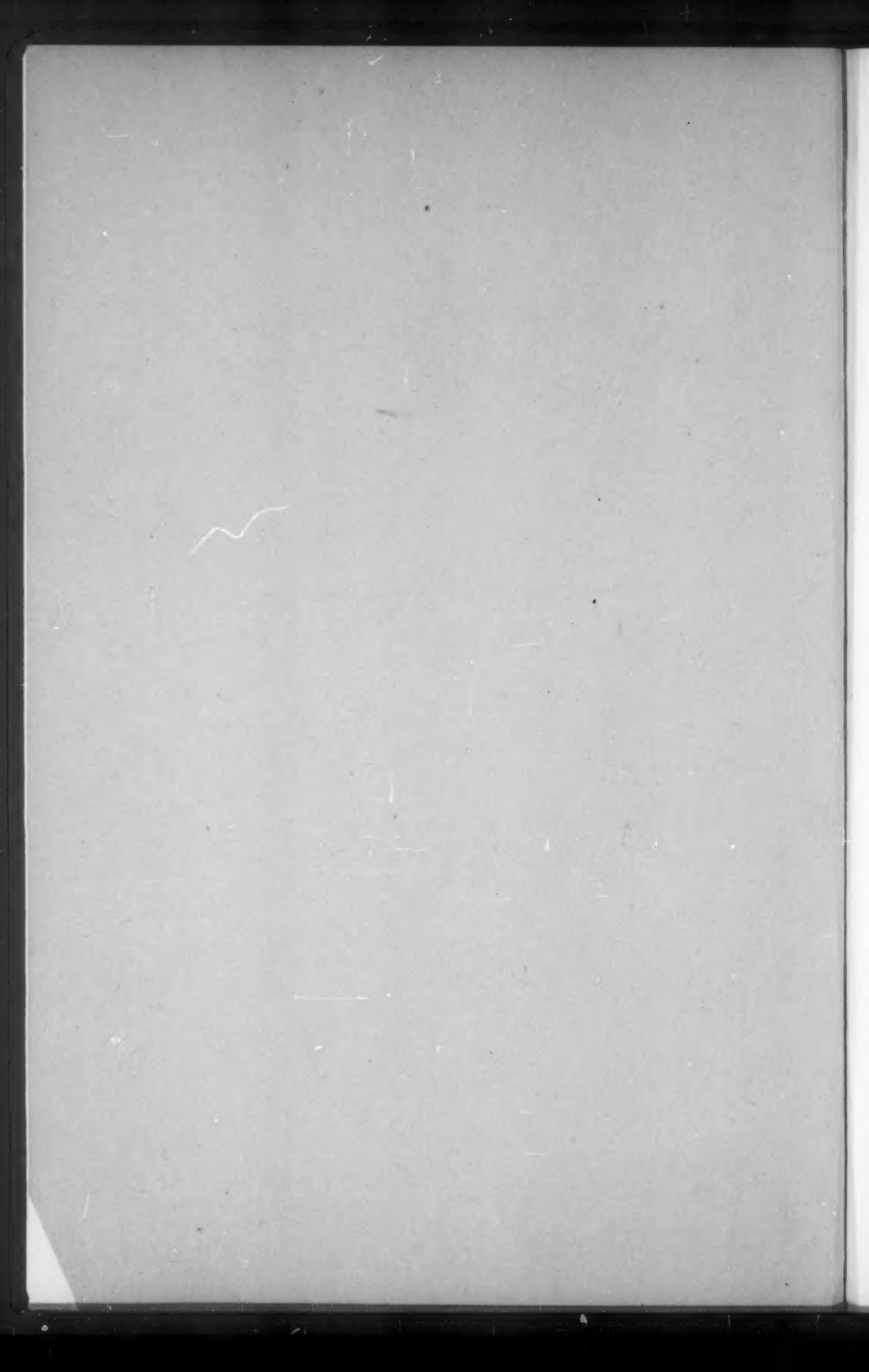
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THE LARYNGOSCOPE.

VOL. XXXVI

JANUARY, 1926

No. 1

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

A CLINICAL AND PREOPERATIVE STUDY OF THE THYMUS IN CHILDREN OF THE TONSIL AND ADENOID AGE.*

DR. HARRIS P. MOSHER, Boston,

DR. ALEXANDER S. MACMILLAN, Boston,

DR. FREDERIC E. MOTLEY, Boston.

DR. MOSHER: There is not a little presumption in publishing a paper dealing with the thymus and status lymphaticus when an investigator like Hammar has studied the thymus for twenty years and has not yet arrived at proved conclusions. Also the magnificent book by Crotti on the "Thyroid and the Thymus" makes one hesitate to add to the enormous amount of printed matter which has already appeared. Slight as the following paper is when compared with such work as Hammar's and Crotti's, the large series of X-ray plates taken in the preoperative study of the chests of children who were to have their tonsils and adenoids removed, has had the good fortune to settle a number of disputed points. The blood study also has contributed something of value. The trite but true remark that where but little is known every little helps is the reason for the paper. The paper is mainly a clinical one, with the addition of a few paragraphs of a speculative nature.

A thymic death is one of the supreme tragedies of surgery. An apparently healthy child dies during the administration of an anesthetic, during or after an uncomplicated tonsil and adenoid operation, or, as recently happened, during a simple circumcision. Again,

*(Based on a series of 4,620 consecutive X-rays; the blood examinations of 110 children shown by X-ray to have an enlarged thymus; and four autopsies on children who died of status lymphaticus.)

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Dec. 18, 1925.

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as reported by one of our medical examiners, a child was standing on the edge of the sidewalk. A runaway horse dashed by and the child dropped dead. At autopsy the condition known as status lymphaticus was found; that is, there was an enlarged thymus and a hypertrophy of all the lymphoid structures of the alimentary canal,

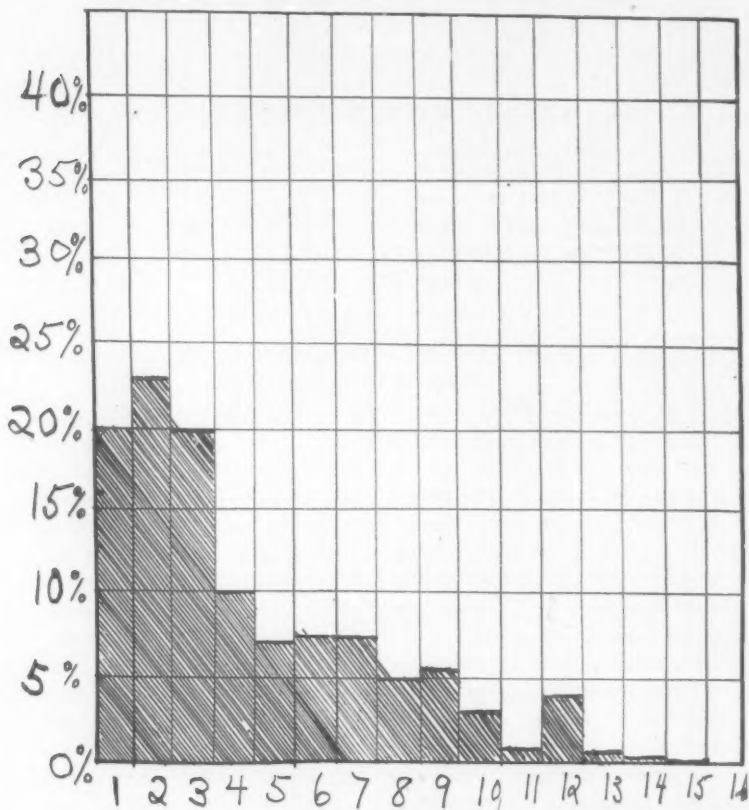


Fig. 1. Percentage suspicious thymus according to age. Macmillan

these structures being the solitary follicles—Peyer's Patches and the mesenteric glands. This slight pathology was all that was found to explain the unexpected death.

Many maintain that there is no such thing as status lymphaticus. It is becoming more and more probable that a so-called thymic

death bears no relation to the state of the gland, the gland simply sharing in the generalized hypertrophy of the lymphoid structures of the alimentary canal. The tragedies continue, yet the mystery as to their cause remains.

In the November issue of *THE LARYNGOSCOPE* for 1924, page 900, the following preliminary notice appeared:

"Following a thymic death a year ago of a child who had been etherized and was about to have his tonsils and adenoids removed, it was made a routine at the Throat Department of the Massachusetts General Hospital and the Massachusetts Eye and Ear Infirmary to X-ray the chests of all children from 1 to 16 years of age who were scheduled for the tonsil and adenoid operation. All children showing a broad superior mediastinum were considered as suspicious thymus cases and were given four X-ray treatments of a third of a erythema dose. The treatments were repeated at intervals of ten days.

Total number of children radiographed, 2,344. Of these, 185, or 7.5 per cent, showed a positive thymus shadow. Of the 185 positive cases, 110 have been treated and successfully operated upon. Ninety per cent of the children treated showed a diminution of the broadness of the superior mediastinum."

The preliminary report just quoted gives the figures for the first year's work. The present paper adds the figures for the second year and brings the series up to the present. There have been no thymic deaths during the past two years. Two cases which the X-ray showed had an enlarged thymus and which had had the regulation treatment with the usual reduction of the gland to normal size gave trouble—one during the giving of the anesthetic (ether), and one after the completion of the tonsillectomy. The symptoms in both cases were those of extreme shock. Both patients recovered.

This paper, as was said in the beginning, is essentially clinical. It consists roughly of three parts. The first part gives a few attempts at clinical research, but is mainly general in character and rather speculative; the second deals with X-ray findings and X-ray technique, and the third and final part deals with the blood examinations. The conclusions are stated first. Then in order follow the facts and the reasons on which they are based.

CONCLUSIONS.

A series of nearly five thousand consecutive (4820) X-rays shows that 7 per cent of children in the tonsil and adenoid age—namely, 2 years to 16—have an enlarged thymus.

The statement that 50 per cent of children have enlarged tubercular glands which give a broad mediastinal shadow indistinguishable from the shadow given by an enlarged thymus is not correct.

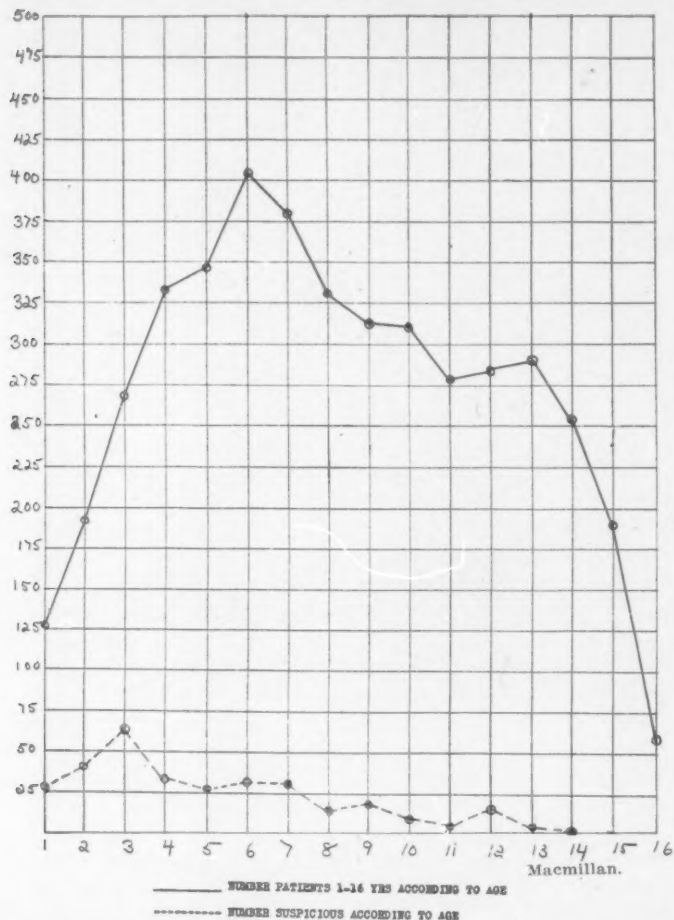


Fig. 2. Since so few cases of enlarged thymus were found beyond ten years of age, only cases from 1-10 years inclusive are now X-rayed.

A series of 90 X-rays taken at the Peabody Home for Crippled Children—a tubercular sanatorium—showed a broad mediastinal shadow in 7 per cent.

The crying of a child during the taking of an X-ray plate does not enlarge the size of the thymus.

Blood counts made on the children shown by the X-ray to have an enlarged thymus gave a slight lymphocytosis, but it was not enough to be diagnostic.

After X-ray therapy of the thymus there was no change in the blood count.

Comparing percussion with the X-ray as a means of finding an enlarged thymus, percussion was successful in 25 per cent of the cases submitted to both methods of examination.

The thymus, like the tonsil, is a lymphatic gland. In status lymphaticus the thymus is enlarged in series with the enlargement of the lymphoid tissue of the alimentary tract—namely, Peyer's

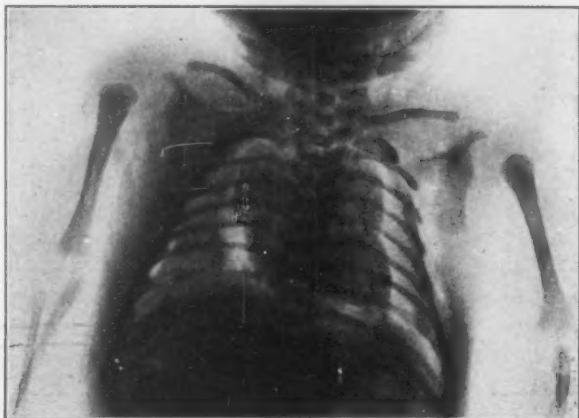


Fig. 3. An X-ray of a baby dead at birth. It shows the shadow of the thymus above the heart shadow and continuous with it.

Patches—the solitary follicles and the mesenteric glands. It has not yet been proven that the thymus has a specific function.

A thymic death is remarkably like a death from acidosis. Theoretically a thymic death could be explained as due to some fault in the chemistry of the alimentary tract—recurring acidosis, or histamine poisoning, which would make possible a sudden and overwhelming toxemia, the explosion being touched off, so to speak, by chemical or nervous causes—the administration of an anesthetic or a severe fright. Conditions in the alimentary tract have to be "just right" to be "touched off." The generalized enlargement of the lymphoid structures of the alimentary canal is the protective response to a recurring invasion by toxins.

Since an enlarged thymus is the only available hint that a generalized enlargement of the lymphatic structures of the alimentary tract may exist as well, since this is the only pathological finding at autopsy in status lymphaticus, since deaths from status lymphaticus are more commonly associated with the tonsil and adenoid operation because it is the most common operation in children, it seems a wise precaution owing to our present lack of knowledge of this condition which can express itself so tragically, to learn the size of the thymus and if it is enlarged to reduce it to normal size by the therapeutic use of X-ray before undertaking the tonsil and adenoid operation, in fact before performing any surgical operation on infants and children.

This procedure to be logical means at least a passive adherence to the older theory that an enlarged thymus is pathological and that it contributes some deleterious substance to the body, and that when the thymus is reduced to normal size this does not occur. As has been stated in the paper, this belief has never been proven. The present trend of investigation seems to be against this theory. Those who hold that the thymus is simply a large lymphatic gland believe also that the 7 per cent of enlarged thymuses found in the 5,000 cases is only a normal per cent of variation. They hold further that the enlarged thymus and the enlarged lymphoid tissue of the alimentary canal in status lymphaticus are of little or of no significance. I have a good deal of sympathy with the view that the thymus is simply a lymphatic gland. I feel, however, that its enlargement, associated with a generalized enlargement of the lymphoid structures of the alimentary canal does mean something. As one of those held finally responsible when a status lymphaticus death occurs in our hospital, I shall continue to act on the older theory and advise the continuance of the routine X-ray of the chests of children and the X-ray treatment of an enlarged thymus when found.

THE FUNCTION OF THE THYMUS.

Histologically the thymus is very similar to the tonsil. Except for Hassals' corpuscles, which are peculiar to the thymus, the tonsil, the thymus and the intestinal lymphatic glands are practically identical structures. The size of the thymus at birth and its active growth during the first two years of infancy are impressive. These two characteristics, plus its embryological origin, which is similar to that of the thyroid, have caused the opinion to be held for years that the thymus is an organ of internal secretion and that it is concerned with growth.

In a review of twenty-four articles on the physiology of the thymus, based mainly on animal experimentation, and appearing from 1904 to 1924, Mr. C. L. Short, of the Harvard Medical School, stated the conclusions drawn from these articles as follows:

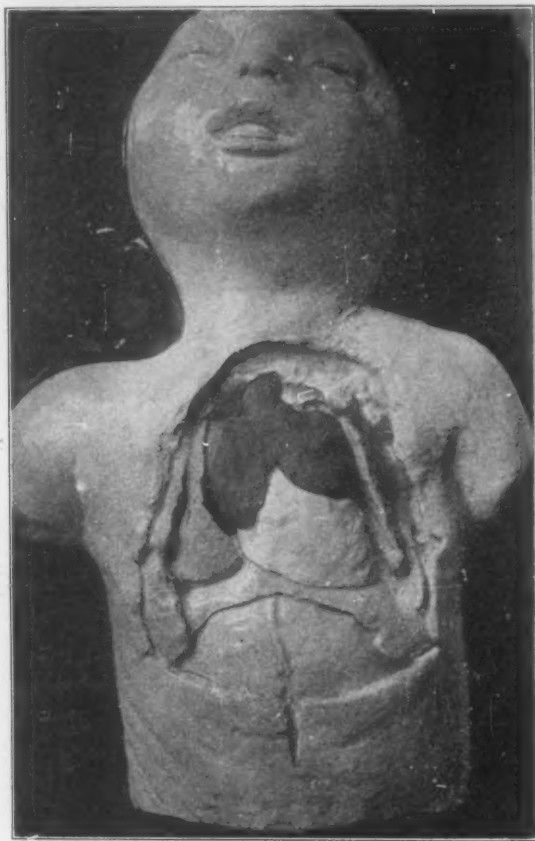


FIG. 4. (Cast by Dr. Mosher and Dr. DeCloedt.) A photograph of a cast of the baby shown in Fig. 3. The chest has been opened and the thymus and the heart exposed.

1. The thymus is not necessary for life.
2. Thymectomy has no effect on the growth and development of the skeleton and organs.
3. Castration delays the involution of the thymus.

4. A substance contained in the thymus when injected causes convulsions.
5. Thymus feeding to salamander larvae with parathyroids causes tetany.
6. Thymic hyperplasia follows double suprarenalectomy.
7. Thymic hyperplasia in thyrotoxicosis is secondary.
8. In birds a relationship exists between the thymus and the egg-producing mechanism.
9. So-called "thymic death," not due to tracheostenosis, probably bears no relation to the state of the thymus gland.

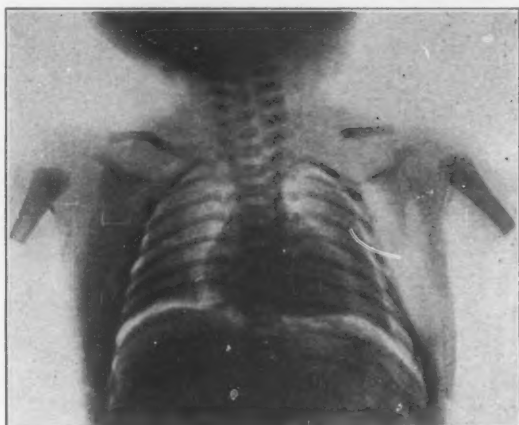


Fig. 5. An X-ray of the same baby shown in Figs. 3 and 4. The thymus has been removed in order to show the heart shadow alone.

10. One, if not the primary function of the thymus gland, is to produce leucocytes.
11. The thymus may also have an anti-toxic function. (Hammar.)

THE SIZE OF THE THYMUS.

Casts of the Thymus at Birth in the Writer's Collection. Casts in the writer's collection of ten babies dead at birth emphasize what has long been known—namely, that the size of the thymus at birth varies greatly. Holt, in his text-book, quoting from different observers, gives the average weight of the normal thymus at birth as 6-7 grams. Anything over 10 grams he considers abnormal. This paper is not concerned with infants, but only with children of the tonsil and adenoid age, that is from 2 years to 10 years. In

this series of X-rays of 5,000 infants and children from 2 to 16 years of age only 7 per cent showed a shadow in the mediastinum which was broader than the shadow of the vertebral column. This shadow could be made to disappear or to coincide with the shadow of the vertebral column by four X-ray treatments. The 7 per cent with the broad mediastinal shadow were considered to have an enlarged thymus.

The following abstract from the *British Medical Journal* was kindly brought to my attention by Dr. Goldsmith, of Toronto. It concerns the subject in hand—that is, the size of the thymus. The following is quoted from the abstract (see Fig. 11):

"In the current number—October, 1925—of the *Journal of Pathology and Bacteriology* will be found an analysis by Dr. A. B. Bratton of data which, collected at Prof. H. M. Turnbull's Institute at the London Hospital, probably form as satisfactory a mass of material as can be had. They comprise 337 persons up to 16 years of age, who died from accidents, burns, or scalds, asphyxia, under anesthesia, or from the immediate results of these. In other words, the ordinary hospital population is excluded, for it is now realized that it is difficult for a child to get into a hospital and more difficult for it to reach the post-mortem room without suffering from something which causes wasting of the thymus. In line with this, Dr. Bratton shows that the thymus is larger and persists longer than is commonly supposed. It increases rapidly in weight during the first two years, then changes little until the seventh year, when it again increases, to fall slightly after the eleventh year till the sixteenth. But more important are two other conclusions which emerge. In the first place, the weight of the normal thymus at any age is so variable that it is practically impossible to say in any individual case whether it is too large or too small. Thus the mean weight at 5 years is about 25 gm. But the coefficient of variation of the weights of which this is the mean is about 35, so that a range from 16 to 34 gm. will exclude about a third of the cases, and one cannot say that any one thymus is abnormally large unless it weighs fully 42 gm. or too small unless it weighs less than 8 gm. The second conclusion is that "we know of no gravimetric evidence that such a condition as 'status thymicus' exists. It seems time that some caution should be exercised in finding in a normal thymus a satisfactory cause of a healthy child's unexpected death."

AUTOPSY FINDINGS IN THREE CASES OF STATUS LYMPHATICUS.

I have the organs from four children who died from status lymphaticus. The gross pathological lesions in all were the same, name-

ly, a generalized lymphatic enlargement—that is, a large thymus and great enlargement of the solitary follicles of the intestinal tract



Fig. 6. (Cast by Dr. Mosher and Dr. DeCloedt). A photograph of a cast of the same baby shown in the preceding figures. The thymus has been removed. The pericardium has not been opened. Notice the oblique line made by the left border of the pericardium, and the sharp notch in the right border.

—an enlargement of Peyer's Patches and an enlargement of the mediastinal and bronchial glands. In neither of the four cases was

the enlargement of the bronchial glands sufficient to compete in size with the thymus gland. In each of the three cases the diagnosis was apparent on opening the abdomen and examining a loop of uncut intestine. The enlarged follicles could be distinctly seen through the intestinal wall. (See Figs. 15-16.)

Autopsied Thymus Cases.

Sex	Age	Weight of Thymus	Operation
M (M.)	1 year	29 grams	Tracheo-bronchitis
M. (R. S.)	3 years	35 grams	Dilatation of sub-glottic stricture
F. (B. C.)	4 years	30 grams	Tonsillectomy
M (T. R.)	5 years	32 grams	Administration of anesthetic (ether)

The above cases furnished the autopsy material which is discussed in this paper. The following case is added in order to record the weight of the thymus:

F (M. H.)	7 mos.	30 grams	See Bratton's Chart Fig. 11
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In these four autopsies the spleen showed macroscopically enlargement of the lymphoid elements. The microscopic findings on one of these cases, an infant a year old, were reported by Dr. Connor, of the Department of Pathology of the Harvard Medical School as follows:

"The microscopical examination shows a spleen in which the pulp is unusually hyperplastic, contains a good many red blood cells, as well as circulating lymphocytes, and a few polymorphonuclear cells, resembling the acute splenic tumors often found in acute infections. There is some increase in the connective tissue septa which are hyalinized, and the blood vessels for the most part are thickened, particularly those in the centers of the splenic follicles, which also have undergone hyaline degeneration. A picture very similar to this may be duplicated by almost any acute infectious disease."

In one of the four status lymphaticus autopsies the lymphoid tissue at the base of the tongue was mammilated and enlarged, suggesting in a striking manner the solitary follicles of the large bowel. It is not uncommon, of course, to have the lingual tonsil enlarged en masse and to be contiguous with the lower pole of the faucial tonsil. In this case, however, the discreet pea-like nodules seemed but a repetition of the solitary follicles. Given a child with an enlarged thymus as shown by X-ray, if these discreet lymphoid

enlargements are found at the base of the tongue, I should suspect a similar enlargement of the lymphoid structure of the rest of the

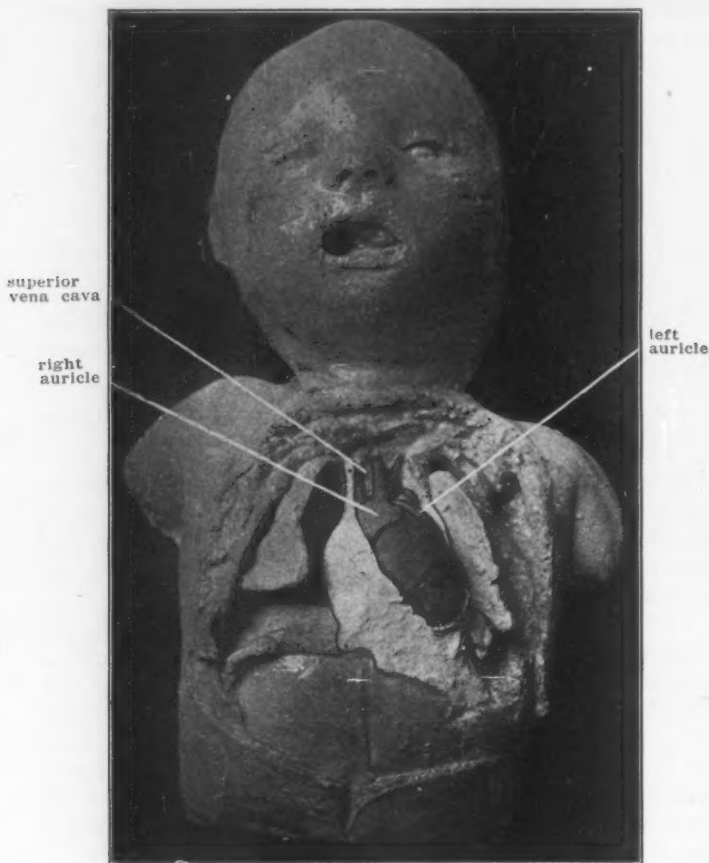


Fig. 7. (Cast by Dr. Mosher and Dr. DeCloedt.) A photograph of a cast of the same baby shown in Fig. 6. The pericardium has been opened to show the upper part of the heart and the great vessels. Notice the anatomical structures which underlie the oblique line made by the left border of the pericardium. They are the left ventricle, the left auricle, the pulmonary artery and the arch of the aorta. On the right there is a little of the right ventricle, the right auricle, and the superior vena cava. In the right border of the unopened pericardium there is a deep notch at the point where the superior vena cava joins the right auricle.

alimentary canal. In other words, I should suspect that the anatomical groundwork of status lymphaticus was present. The above

observation is the finding of an individual case only. If it could be duplicated and my supposition substantiated, it would be of some clinical importance.

A histological study was made of the thymus glands removed at autopsy from the three cases of status lymphaticus. Dr. DeCloedt shared this work with me. We were especially concerned with Hassal's Corpuscles which are structures peculiar to the thymus. Our observations I hope to report in a later paper. For the present it is sufficient to say that there are two theories about the formation of Hassal's Corpuscles. The first and oldest is that these bodies

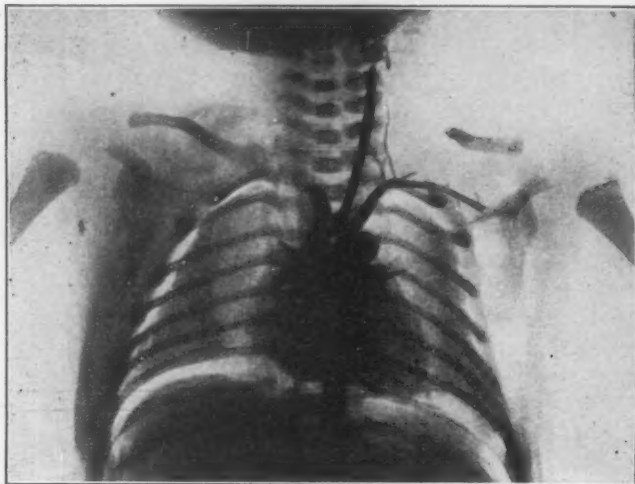


Fig. 8. An X-ray of the same baby shown in Fig. 7. The heart and great vessels have been injected. This film is to show the structures which underlie the oblique line made by the left border of the unopened pericardium. See Fig. 7.

are the result of the degeneration of the blood vessels. The second is that they are formed from the reticulum cells of the thymus and are not associated with the blood vessels. Further, according to this theory, they are supposed to be the seat of the peculiar activity of the thymus and their number indicates the activity or rather the toxicity of the gland. As far as our joint observations have gone we have been led to believe that the corpuscles are formed in both ways—that is, from the blood vessels and from the reticulum cells or jointly from both. Rather than hold back from publication any longer the work of Dr. Macmillan and Dr. Motley, the present

paper is published before the work on Hassal's Corpuscles is brought to a conclusion.

WHAT CAUSES A THYMIC DEATH?

The oldest theory as to the cause of a thymic death is that it is the result of pressure of the enlarged gland on the trachea. In

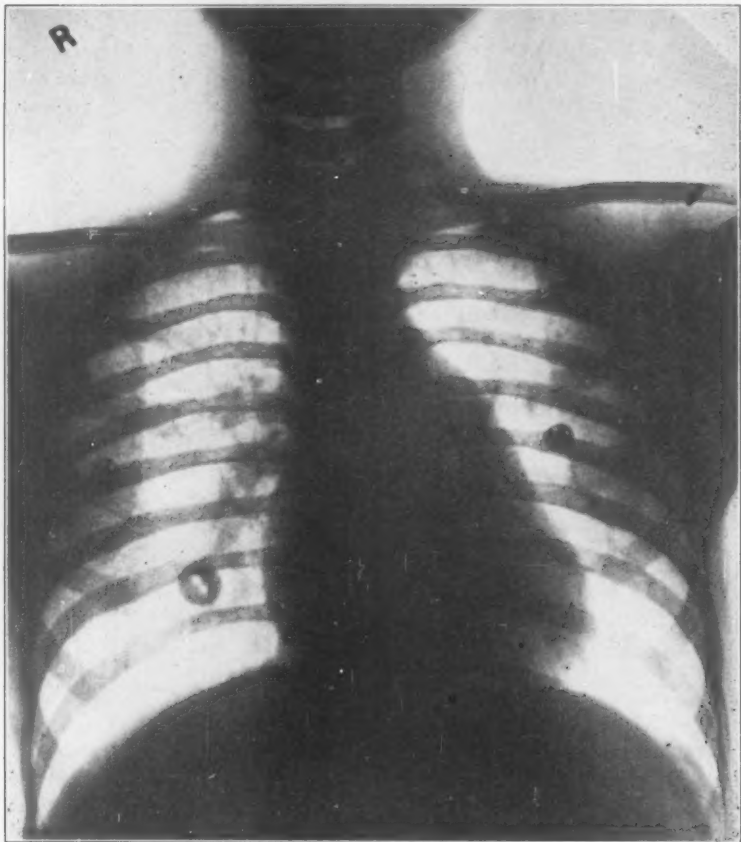


Fig. 9. An X-ray showing an enlargement of the left auricle of the heart. Such an enlargement displaces the pericardium and interferes with the symmetry of the oblique line made by the left border of the pericardium.

infants with what is called thymic asthma this is the actual cause.

Thymic asthma due to pressure occurs only in infants, not in children of the tonsil and adenoid age. Can the enlarged thymus

of the children included in the 7 per cent of the series given in this paper produce enough pressure to cause death? The histological structure of the thymus is such that it cannot suddenly enlarge any more than the tonsil. It is conceivable that the wedge-like thymus if not enlarged enough to actually narrow the trachea might be forced up and jammed into the narrow space between the sternum, the inner ends of the clavicles and the vertebral column and exert pressure enough to influence the vagus or the left recurrent laryngeal nerve. In the three autopsies of the thymus cases—one an infant a year old—the other two cases children of 3 and 4 years, respectively—there was no apparent pressure on the trachea.

The more favorite theory as to the cause of a thymic death is that the gland suddenly liberates a death dealing toxine. Repeated

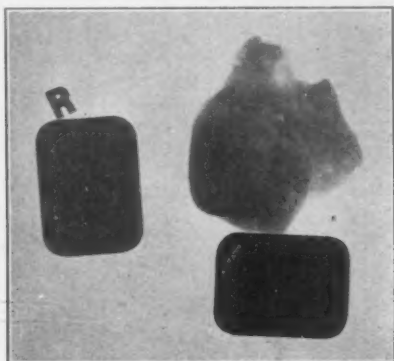


Fig. 10. Shows the comparative size of a 20-gram thymus removed from a baby dead at birth and the ordinary dental film.

and most painstaking experiments on animals have so far failed to give any proof of this theory. Modern investigation tends to make the thymus simply a lymphatic gland. Here again it is hard to entirely rid oneself of almost inborn beliefs and to accept modern investigation as telling the whole story, when science so often cannot tell all. In this matter it is hard to make belief loyal to proof. One keeps going back to the old theories in spite of the fact that they are apparently disproved.

There is a most striking similarity between a death from acidosis and a death from status lymphaticus. I cannot help feeling that some fault in the chemistry of food will be found eventually to be at the bottom of the condition. At present in general surgery acidosis

in one form or another is having its day. It is one of the great causes or, rather, the great accompaniment of shock.

The above paragraph shows that there is nothing definite in our present knowledge of status lymphaticus. One man's guess is as good as another's and I have taken the liberty of giving mine. In reading about this subject and in thinking it over, two things

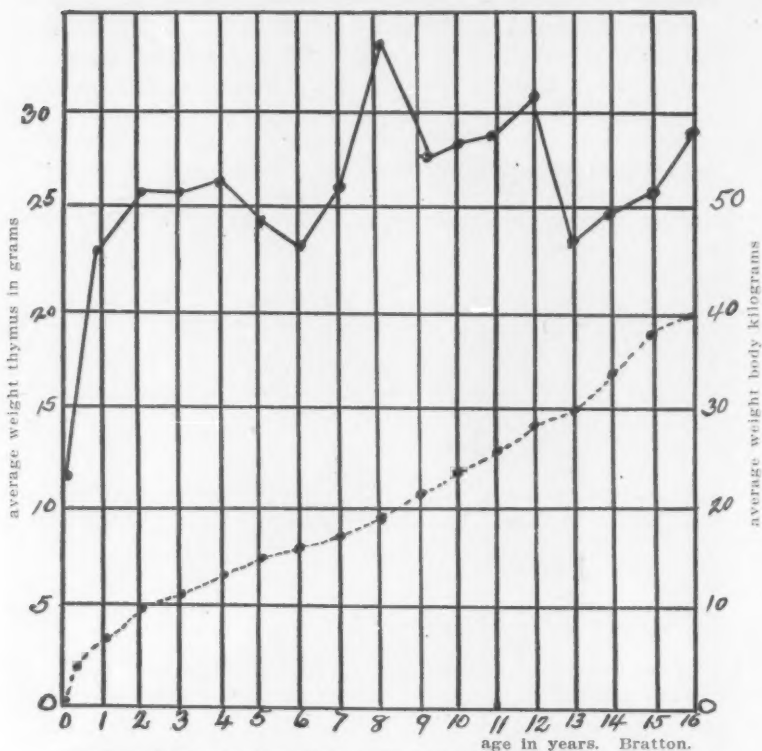


Fig. 11. Bratton's chart giving the weight of the thymus up to sixteen years. According to these figures the thymus is much larger than the older authorities state it to be.

have struck me forcibly—the similarity between a death from acidosis and a so-called status lymphaticus death, and the rapidly increasing role that acidosis is playing in the toxemias associated with certain forms of intestinal pathology, namely, pyloric stenosis and intestinal obstruction. Further, the association of acidosis and shock and the converse—the prevention of shock by correcting or

by making acidosis impossible by giving insulin and glucose, is to my mind a very thought-provoking observation.

When we find enlarged glands we usually think of the enlargement as due to the reaction of the glands to infection. It is their business to protect the rest of the body as far and as long as possible. An enlargement of the tonsils, however, can be produced by food without infection. The following is quoted from Burnett:

"The palatine and pharyngeal tonsils are the only exposed portions of the lymphatic system. In childhood if they are hypertrophied and form a weak and non-resistant tissue, they are frequently thought of as a portal of entry for bacteria. Perhaps the enlarge-

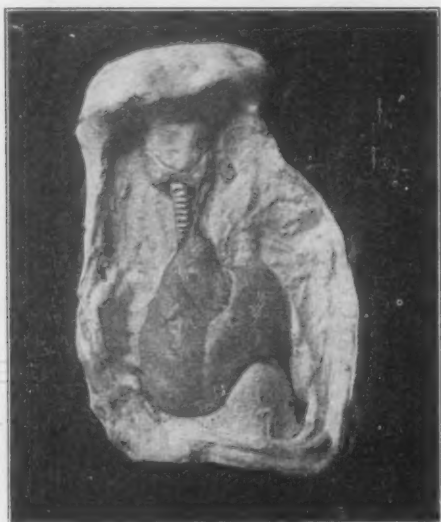


Fig. 12. Photograph of a cast of the thymus of a baby dead at birth. Compare with Fig. 4. Figs. 4, 11 and 12 show the variations in the size of the thymus at birth.

ment of these glands is merely a minor phase of status lymphaticus in which individuals have little or no stamina. At any rate, by feeding a few kittens on a high fat-normal calorie, high fat-high calorie, high sugar-normal calorie, high sugar-high calorie diets, Lefholz has shown a relative increase in the lymph tissue according to the food ingested. The high caloric diet in either sugar or protein produced a marked increase in the size of all the tonsils, but the increase was even greater with food containing an excess of fat."

The Progress of Nutrition: Francis Lowell Burnett, *Boston Medical and Surgical Journal*, Vol. 192, No. 3, pp. 112-117, Jan. 15, 1925. Here again food and the chemistry of food come into the picture.

On the theory that the enlargement might be an expression of a chronic or recurring acidosis I had a series of children who showed to X-ray an enlarged thymus tested for acetone and diacetic acid. In an occasional case one or both substances were found in the



Fig. 13. Photograph of a cast of the thymus of a baby dead at birth.

urine but there was no constancy in the findings and this line of search was given up.

It was found that the enlarged Peyer's Patches and the enlarged solitary follicles in a specimen of intestine taken at autopsy from a case of status lymphaticus showed distinctly in the X-ray post-mortem. Thinking perhaps that they might show in the living—

and regarding for the purpose of the investigation all cases with an enlarged thymus as possible cases of status lymphaticus—ten children with an enlarged thymus had their intestinal canals thoroughly

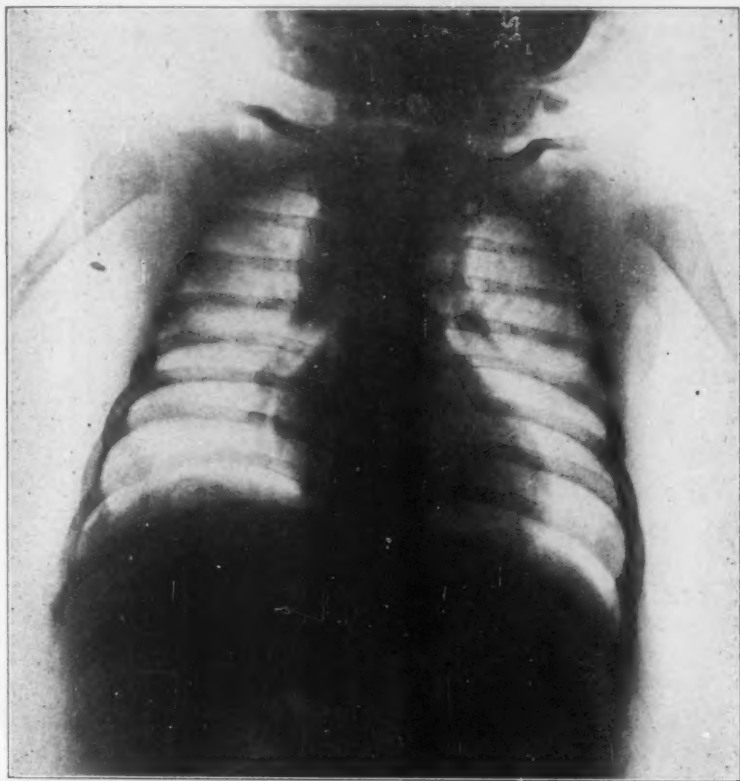


Fig. 14. X-ray of a baby two months old who had an open safety pin, point up, lodged in the beginning of the esophagus. The attempt to close and remove the pin failed and the pin was pushed into the stomach. Following the manipulations there was emphysema of the right side of the neck. The plate was taken at this time. It shows that the air descended in the mediastinum and pushed the thymus free from the heart. It shows further that the great vessels play no part in the shadow cast by the base of the thymus.

cleaned out by catharsis and then the lower bowel was inflated with air and X-rayed. In this way a very striking picture was obtained of the lower portion of the intestinal tract. So far there have been no positive findings. (See Fig. 17.)

Still thinking along the line of a fault in intestinal chemistry I have wondered whether or not histamine poisoning, acute or chronic, may not play a part in these cases of status lymphaticus, and I hope to make some tests along this line.

DR. MACMILLAN: 4,825 children ranging in age from a few months to 16 years were radiographed before tonsillectomy and an enlargement of the thymus gland diagnosed in 340, or about 7 per cent. All children were radiographed in the supine position because

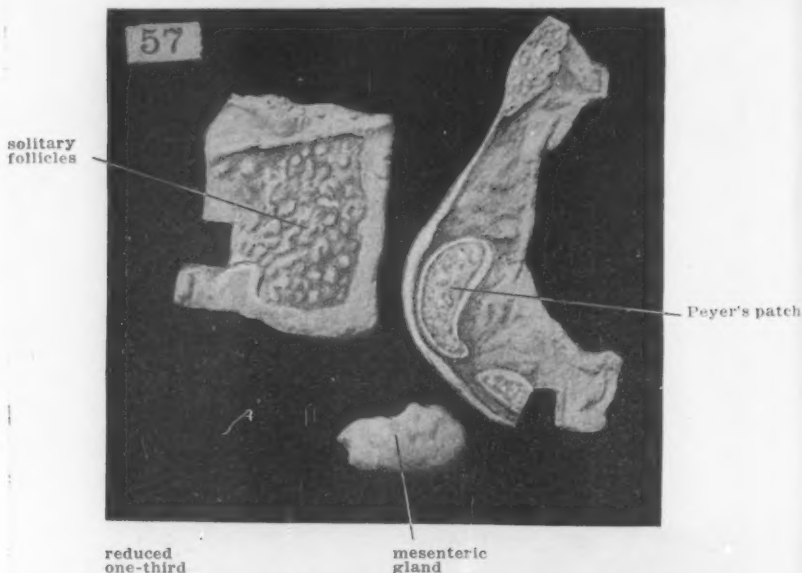


Fig. 15. A photograph of a cast of pieces of the large and small intestine and a mesenteric gland removed at autopsy from a child of three who died of status lymphaticus.

Specimens show greatly enlarged Peyer's Patches and Solitary Follicles, and a very large mesenteric gland. Except for an enlarged thymus as well the above lymphatic enlargement constitutes the only macroscopic pathology found in cases of status lymphaticus.

in this position the child could be easily managed and held in proper alignment. We proved to our satisfaction that if a thymus was larger than normal, that is, if it extended outside the border of the dorsal bodies, it could be demonstrated in the supine, prone, or erect position. We always tried to avoid rotation of the head because this changes the shadow of the heart and mediastinum and is prone to lead to error in diagnosis. (See Figs. 1 and 2.)

Ninety-three per cent of cases showed no enlargement in the superior mediastinum and these findings coincided with the findings on the anatomic specimen after removal of the thymus.

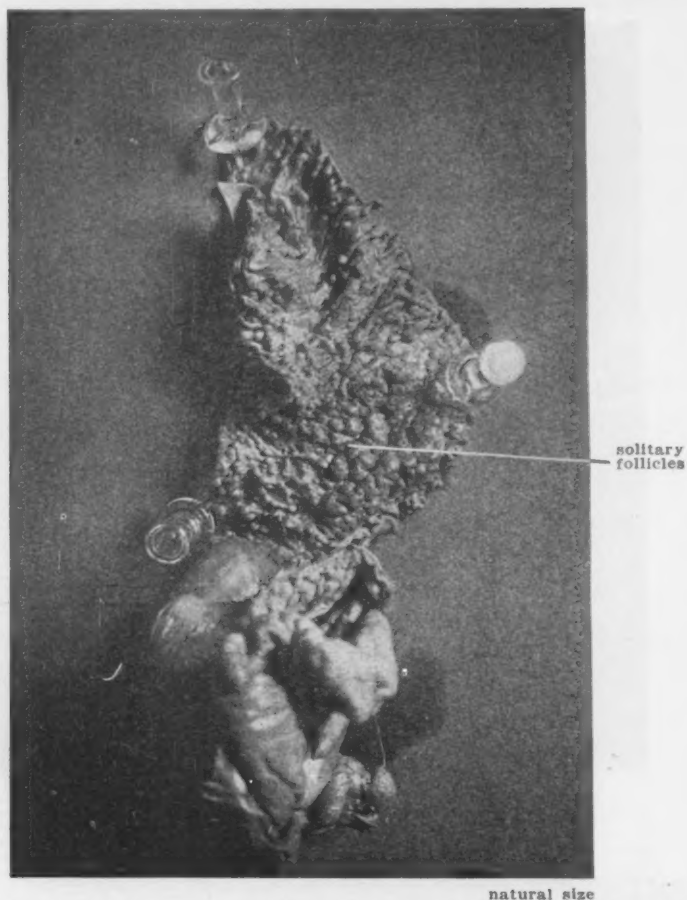


Fig. 16. Shows the inner surface of the caecum removed at autopsy from a child of three who died of status lymphaticus. Notice the great enlargement of the Solitary Follicles.

None of the fatal cases, before this investigation was started, had given a clinical history of the classical syndrome of enlarged thymus and none of our 7 per cent gave any suggestive history. We feel

that within this 7 per cent lie the possible fatal cases and that this number should be given the benefit of X-ray treatment.

X-ray treatment failed to reduce the shadow of 1 per cent of cases and subsequent diagnosis of other mediastinal pathology was

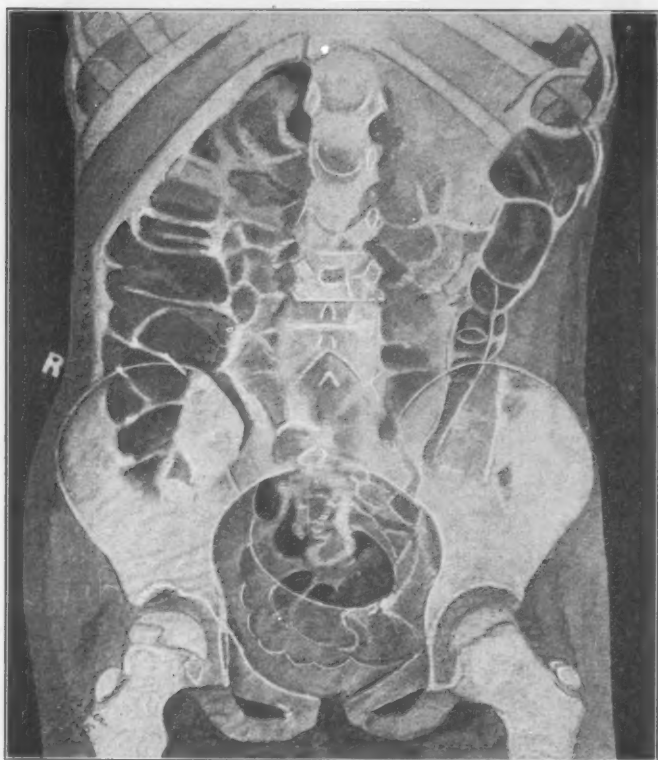


Fig. 17a. Retouched X-ray tracing of the abdomen of a girl seven years old. The X-ray of the chest showed a moderately enlarged thymus. After catharsis the intestines were ballooned with air by means of a catheter passed into the rectum. The caecum and the descending colon are shown very distinctly. Notice how sharp the Valvulae conniventes are. Compare with the following figure and with Fig. 16.

made. These figures do not coincide with the general belief of the frequency of enlarged glands. (See Figs. 18, 19, 20, 21 and 22.)

The X-ray was used in all treatments, one-third of an erythema dose was given anteriorly for four doses at ten-day intervals and all patients were operated upon safely.

The diagnosis of an enlarged thymus is based upon the shadow above the heart continuous with it and extending beyond the shadow cast by the borders of the dorsal spine.

Other causes of the enlargement of the superior mediastinal shadow, such as peri tracheal and peri bronchial glands, anomalies of the great vessels or pathology in the dorsal spine, should be considered and ruled out by the therapeutic test. The thymus gland will be diminished in size by X-ray therapy, the same amount not

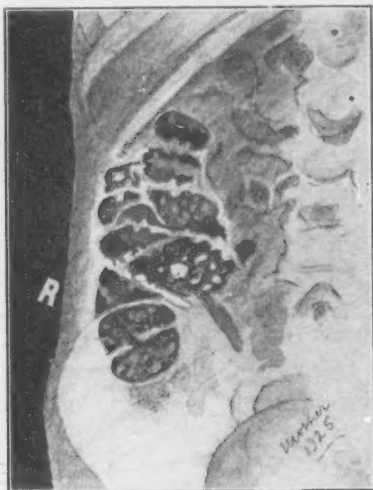


Fig. 17b. Theoretical X-ray of the caecum in which the Solitary Follicles are enlarged. The writer has not yet found such a picture in the living. If the solitary follicles are present in any such numbers as shown in the autopsy specimen illustrated in Fig. 16, the preceding X-ray makes the writer believe that they would appear on the film. In the autopsy specimen the solitary follicles are especially prominent as pedunculated tabs on the valvulae conniventes. This is illustrated in the small drawing.

The writer believes that in many cases in which the X-ray shows an enlarged thymus, the gland is enlarged alone. There is no associated enlargement of the lymphoid structures of the intestinal tract. Given, however, a case of enlarged thymus and an enlargement of the solitary follicles of the caecum as shown in this theoretical X-ray there is X-ray evidence of the only pathological condition found at autopsy in status lymphaticus.

having any effect on tubercular glands, or anatomic variations, and we believe this to be the only means of making a correct differential diagnosis, and for this reason all patients are radiographed following treatment.

In the beginning of this study of the thymus we felt that there was some question about the broad shadow in the mediastinum being a shadow of the thymus alone, as we held it to be, or whether

the great vessels played a part in it. Further, we wished to satisfy ourselves that the shadow of the thymus on the X-ray film was an accurate shadow of the gland. The second point was settled in the

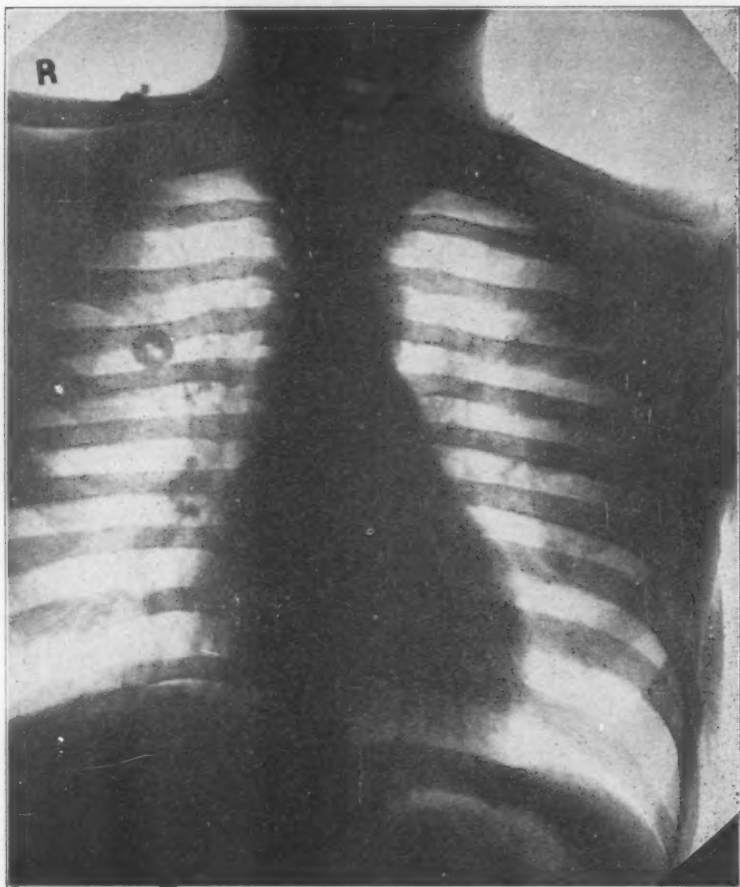


Fig. 18. X-ray of the chest showing a normal heart (child). Compare with the following four figures.

following manner. Two babies dead at birth were X-rayed and then the thymus exposed by dissection. (See Figs. 3, 4 and 5.) The X-ray film gave the size of the gland accurately in both cases.

There were no bronchial glands in either case. A child died from membranous tracheo-bronchitis caused by the staphylococcus albus. After death and before the autopsy the X-ray showed an enlarged

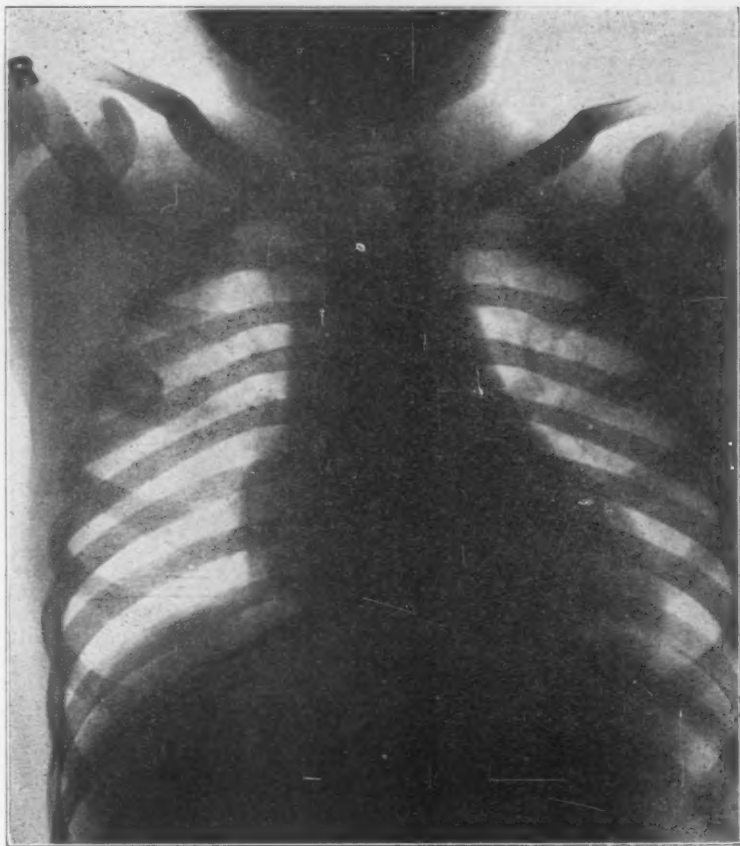


Fig. 19. X-ray of the chest of a child showing an enlarged thymus.

thymus. The autopsy confirmed the accuracy of the X-ray film as to the size of the thymus.

The first point about the vessels and the thymic shadow was settled as follows: A child two months old was brought to the

hospital with an open safety pin in the esophagus, point up. The attempt to close and remove the pin failed and it was pushed into the stomach. Following the manipulations there was emphysema of the right side of the neck. An X-ray taken at this time showed

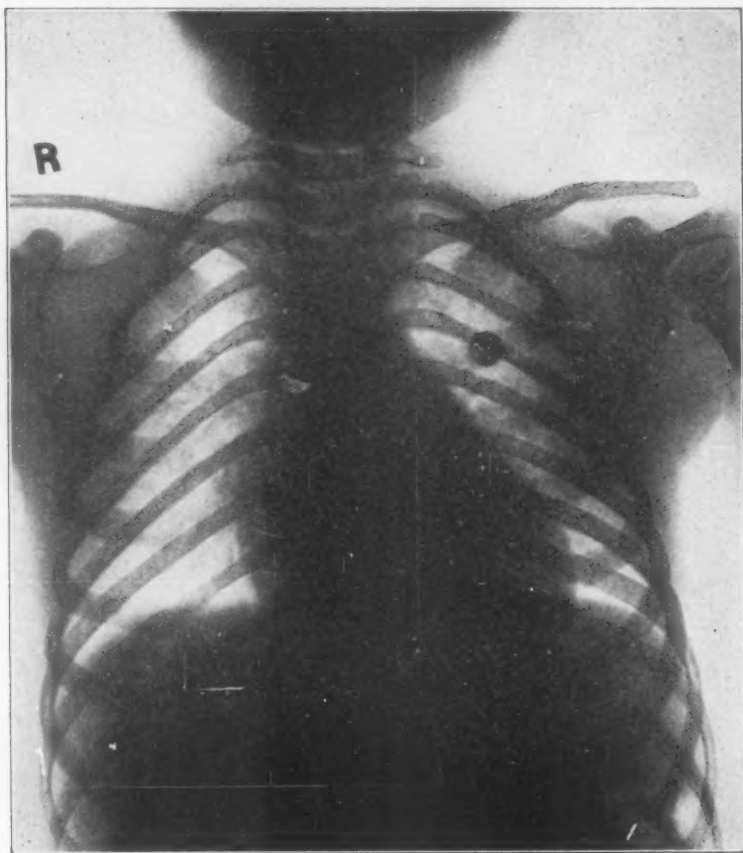


Fig. 20. X-ray of the chest of the same child shown in Fig. 18 after four X-ray treatments.

that the air had descended in the mediastinum and had lifted the thymus up and away from the heart. No shadow of the great vessels appeared. This baby naturally worried us, but the outcome was fortunate—the pin was passed in four days. From the above

finding it is held that the great vessels play no part in the shadow cast by the thymus. (See Fig. 14.)

Still another point was in dispute. It has been stated—Betcher—that 50 per cent of children show a broad mediastinal shadow caused by tubercular glands, and this shadow cannot be differentiated from the shadow of an enlarged thymus. In the large series of X-rays of the chests of children reported in this paper, only 7 per cent

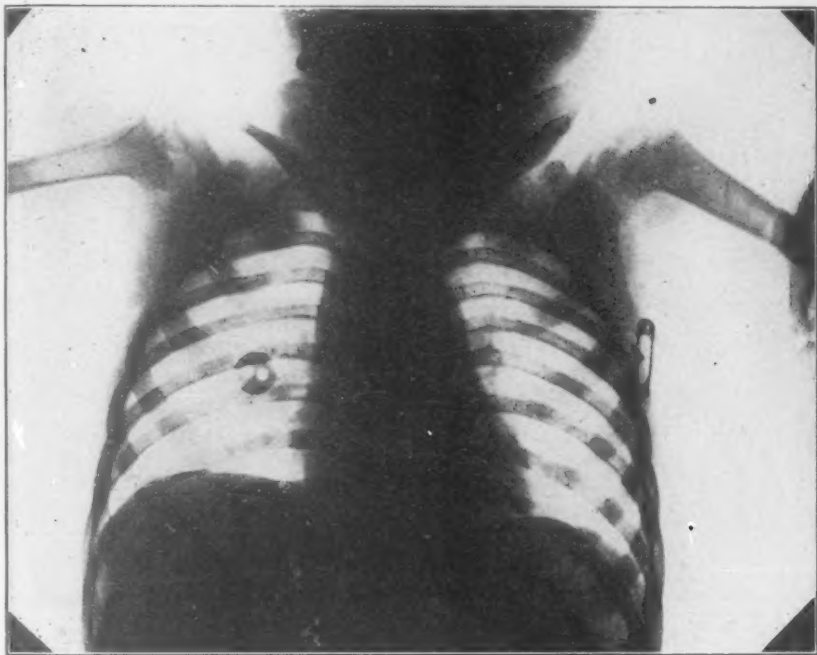


Fig. 21. X-ray of a child with an enlarged thymus.

show a broad mediastinal shadow. Further, a series of 90 X-rays was taken for the purposes of this paper by Dr. Kirby and Dr. Schall at the Peabody Home for Crippled Children. This is a tuberculosis sanatorium. In this series again the percentage of cases which showed a broad mediastinal shadow is only 7 per cent. In the three autopsies on children with status lymphaticus the bronchial glands were only slightly enlarged in one.

In our cases, crying, contrary to the general opinion, has never produced any enlargement which could be taken for a thymus shadow. Microscopic study of the gland will support this. With expiration, the heart encroaches upon the mediastinum. Its shadow should not be confused with that of the thymus.

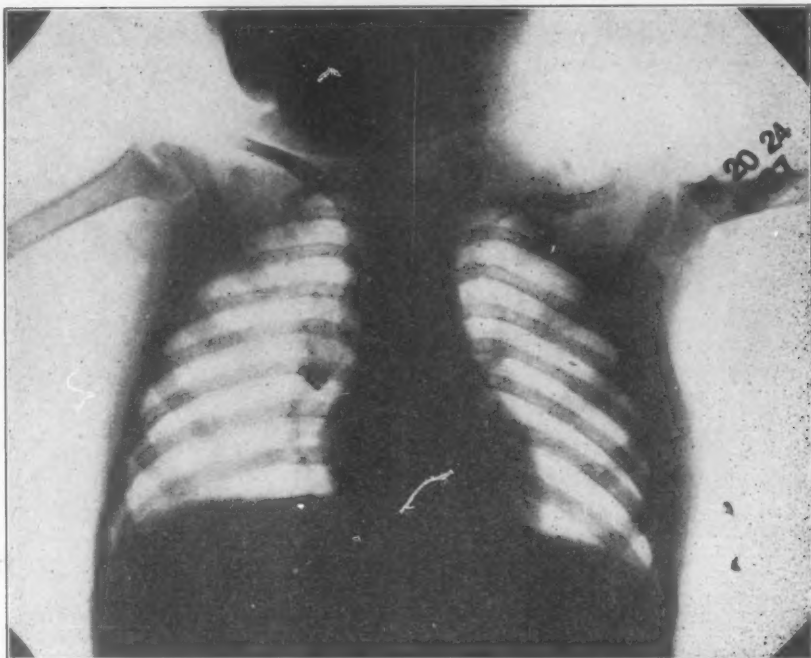


FIG. 22. X-ray of the same child shown in Fig. 21 after the thymus has been reduced in size by X-ray treatment.

REPORT ON THYMUS CASES.

DR. MOTLEY: For 11 months, Nov. 1, 1923, to Oct. 24, 1924 (approximate dates).

Total cases X-rayed, 2,128.

Positive thymus cases discovered by X-ray, 161.

Per cent positive thymus cases of total, 7.55 per cent.

161 cases (eye and ear, nose and throat, and houses cases).

110 reported for differential blood count before X-ray.

110 cases reported to social service for blood counts, record, etc.

Approximately 50 cases: differential blood counts after X-ray.
(110 cases)

Numbers by ages.

Age	1	2	3	4	5	6	7	8	9	10	11	12	13	14
No. of cases by age	7	23	11	6	11	5	11	7	3	5	1	4	2	1

(See Fig. 20.)

The typical thymus case as described by various writers is the blue-eyed, fair-haired, plump child.

110 positive thymus cases classified:

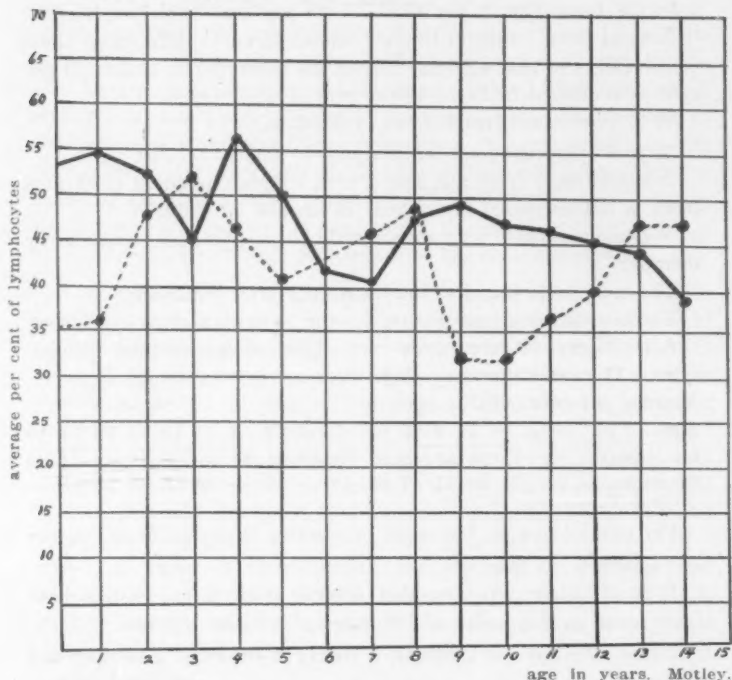


Fig. 23. First blood count—total lymphocytes. Full line. Second blood count—total lymphocytes. Dotted line.

1. As to complexion:

Blonde—45 cases

Negro—1 case

Brunette—39 cases

Unclassified—23 cases

Blonde=45 per cent. Brunette=55 per cent.

2. As to nourishment:

Thin—15 cases, or 12 per cent.

Fairly well nourished—85 cases, or 80 per cent.

Fat—10 cases, or 8 per cent.

28 of 110 positive cases by X-ray were found to have wide area of substernal dullness in Children's Medical, Massachusetts General Hospital, therefore 25 per cent were identified as positive by physical examination.

Differential Blood Count:

Before X-ray 110 cases (1-14 years).

Average total lymphocytes, large and small=47+ per cent.

Average of 50 ordinary T. & A. preoperative cases (1-14 years) collected from Eye & Ear O.P.D.=28 per cent total lymphocytes.

Normal blood count in infancy and children in differential blood count differs in that the lymphocytes are increased to almost 50 per cent as compared to 24 to 30 per cent at adolescence. (Abt.)

40 to 70 per cent lymphocytes in children.

20 to 25 per cent total lymphocytes in adults. (Nelson.)

It would seem from this that a total lymphocyte count in thymus cases is not increased above that of normal in children.

A count was made on approximately 50 positive cases after X-ray therapy.

The count was found to vary but little after treatment.

The average total lymphocytes for the 50 cases was 45+ per cent.

After X-ray: 7 cases show very slight increase in total lymphocytes. 11 cases show very slight decrease in total lymphocytes.

Average per cent cells by age:

Age	*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1st count	52	54	52	45	57	50	42	41	46	47	32	48	44	44	38
2d count	34	49	51	47	69	40	—	46	—	30	30	36	39	45	—

after X-ray

Per cent of sex in 110 cases of positive thymus: Male, 56 per cent; female, 44 per cent.

It is of interest to note that several brothers and sisters have been found in this series of 110 cases of positive thymus:

These cases are: 3 brothers, 3 sisters, 2 brothers, 1 brother and sister.

*Denotes cases in which age was not recorded. See Curved Plotted No. 2 for above data.

PRACTICAL DEMONSTRATION OF MODERN PEDAGOGIC METHODS IN THE TRAINING OF THE DEAF CHILD.*

DR. MAX A. GOLDSTEIN, St. Louis.

Six years ago, on invitation of Dr. Wendell Phillips, I participated here in New York City in the organization of the American League for the Hard of Hearing. I am, therefore, not a stranger on this platform; I had the pleasure of being present at its birth and I share with its progenitors the gratification in the development of a very lusty child, for the American League for the Hard of Hearing is today an established, influential, active force in the larger communities. Leagues for the Hard of Hearing are especially concerned with the welfare of the deafened adult.

The work which I have been invited to present for your consideration tonight deals more especially with the deaf child,—the child congenitally deaf or the child who has acquired deafness at so early an age that this handicap requires an unusual form of scientific consideration and of special pedagogy. Unfortunately, scientific research in the causes of congenital deafness have not yet produced sufficient data for our guidance and progress in the education of the deaf child has made less important strides than similar progress in the uplift of other types of the handicapped child. The crippled child, the blind child and the mentally defective child have had a very fair share of consideration pedagogically, scientifically and sociologically; but the deaf child, because he has been less seriously studied and less clearly understood, has always been a neglected entity and the pedagogy of the deaf child has been in a state of partial inanition.

When I returned from post-graduate work abroad some thirty years ago, I looked for an opportunity to apply some of the thoughts gathered in Vienna and elsewhere so that I might check up by my

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Dec. 12, 1925.

*Presented by teachers and pupils of Central Institute for the Deaf of St. Louis, before the New York Academy of Medicine in cooperation with the Section on Otology, Nov. 5, 1925.

own findings the principle of auditory stimulation; but there is always difficulty to find an entering wedge in the application of modern or radical ideas in any community that is fairly well saturated with orthodoxy. Schools for the deaf in America thirty years ago had not advanced in pedagogic liberalism to give so new a thing as auditory stimulation an unbiased consideration. To make possible a more progressive form of training for the deaf child, therefore, I was impelled and compelled to organize an independent school for the deaf, not because I desired to place another school for the deaf in the field, but because I craved the opportunity to correlate the experience of the trained teacher of the deaf and the scientific background of the otologist and laryngologist, hence the origin of Central Institute for the Deaf in St. Louis. It was the first school to be organized and adopt as its working principle the daily cooperation of the trained teacher of the deaf and the trained otologist and had for its goal the improvement in pedagogy and the more serious study of the deaf child. The product of twelve years of serious application of these ideas and principles is crystallized in the practical demonstration offered you tonight. As an end-result of these observations, we are prepared to offer for your critical consideration a modern form of pedagogy having as its goal the emancipation of the congenitally deaf child, who, notwithstanding his serious handicap, is enabled to hold his place in the world of speaking and hearing people, to express his thoughts in our language and in a speech that is flexible, fluent and understandable and with an efficiency in lip-reading that makes his contact with speaking humans almost normal.

In an open meeting of a scientific body such as this where the interested laity is invited to participate, there is much opportunity for legitimate publicity. I believe that the great American public, through its greatest source of information, the American daily press and the American periodical, is entitled to all the intelligent information that may be gathered and presented concerning the development of educational opportunities and newer scientific work; concerning the publication of all principles of mechanics, such as the radio and the telephone, that might be of benefit to the deaf child; concerning medical research that has tested out and given its stamp of approval to the application of such principles. I believe emphatically that all such information should be intelligently disseminated; that there should be a general protest against "sob-stuff" stories that are constructed of fairy-tales instead of facts, and thus bringing about much unfortunate misinformation to be

absorbed by an unsuspecting and innocent public. If the public at large could obtain honest and accurate information on such subject-matter, the poor deaf man who went up in an aeroplane with a pilot a few weeks ago with the idea that when he descended from the upper air strata his hearing would be restored and he would be able to speak, might have avoided death by an overzealous enthusiasm created by newspaper reports.

Think of the blasted hopes of many deafened people who are told in most glowing terms in the daily press and elsewhere of the wonderful new discoveries by which their hearing will be restored and by which they will promptly be lifted out of the depths of despair into a hearing world. These wonder-working cures must be stripped of the colorful imagination of newspaper reporters, ambitious tradesmen and quacks.

It is an unfortunate fact that there may be many opportunities vouchsafed to the deaf by the application of important principles in modern mechanics and physics, such as the radio and the telephone; the application of these modern ideas have their definite scientific and utilitarian value, but they are so garbled and so exaggerated in their presentation to the public that whatever scientific and utilitarian value they possess is thus lost.

The congenitally deaf child is the principal subject for our consideration tonight. I differentiate between biological congenital deafness and pathological congenital deafness. In biological congenital deafness there may be absence or malformation of any part of the auditory apparatus in its central or peripheral aspects; in pathological congenital deafness, there is usually a background of hereditary syphilis, rickets, tuberculosis or some intrauterine or other constitutional entity to which the deafness may be traced.

It is an interesting observation that the biologically congenital deaf child is very rarely totally deaf. This fact has been substantiated not only by the observation of investigators in otology but by experienced teachers interested in the training of the deaf child. It is a significant fact that over 30 per cent of all pupils in all schools for the deaf in this country have some residuum of hearing. This residuum may vary from an inability to hear more than imperfect sounds of the human voice to that of being able to interpret fluent speech at close range.

Until recently most schools for the deaf have not seriously considered these biologically congenitally deaf children with varying degrees of remnants of hearing. In many instances, they may still be found in schools where the sign language is still prevalent.

The somewhat painful controversy between the advocates of speech methods on the one hand and the orthodox adherents of the sign language and finger spelling method on the other is hardly pertinent to our presentation. I cannot forego the criticism, however, that it is a serious error to consign to a school in which the sign language is taught a deaf child that can still hear the human speaking voice at a distance of four to five feet and to still subject this child to instruction by sign methods. A deaf child with this remnant of hearing who is not given an opportunity for stimulation of his auditory mechanism or where no attempt is made to reach his brain through his ear instead of by signs or mechanical speech, is unjustly dealt with. In short, such an act is an educational crime.

Our mission here is to advocate the improvement of conditions in the status of the deaf child throughout the nation; we are not here to demonstrate exclusively what Central Institute for the Deaf can do, but rather to spread the gospel of better speech, of better training for deaf children, of better opportunities, of developing teachers with better qualifications; in short, for the consideration of the improved surgical status of the American deaf child of the future.

But we have not come to the metropolitan city of New York to make speeches but to demonstrate by practical evidence to what degree of efficiency the modern pedagogy of the deaf child may be developed. We have selected from our group of pupils at Central Institute for the Deaf in St. Louis examples to demonstrate various phases of the work in which an up-to-date school for the deaf is engaged and we wish to submit these living documents-in-evidence for your impartial judgment.

Before presenting our pupils and teachers for this demonstration I want to make a plea with my otological colleagues. My plea is emphasized by the following story:

Not long ago I was invited to address a large group of special teachers in one of the important metropolitan cities of the East. I was the personal guest of the most prominent otologist in that city. The school auditorium in which the meeting was held was some distance away from the center of the city. We drove to this school for the deaf in my friend's automobile. On our way to the school my colleague-chauffeur stopped four or five times, leaned out and engaged passersby in conversation. On inquiry, I found that he was asking the way to the school. We arrived safely, I was introduced gracefully by my distinguished otological confrere and I could not resist the temptation of mentioning this incident in my intro-

ductory remarks. Here was the best-known otologist in one of the largest cities of the nation, who had never before crossed the threshold of this, one of the best-known schools for the deaf in the East. He privately told me later that he had never visited any school for the deaf at any time.

To me this incident is pathetic and it indicates in a simple, homely way one of the most serious shortcomings of the otological profession. The average otologist does not know the deaf child and that is as true in the City of New York as in any other community; and, permit me to assert that the otologist is just as much responsible to the community at large for the development of the deaf child and for contributing his interest and his talent to that development as he is for the child with a potential one-thousand dollar mastoid infection or for the child with a pair of diseased tonsils in which the dollar sign may be evident. There is an increasing spirit of commercialism developing in the medical profession that threatens to assail its dignity and prestige and undermine its substantial influence in the community. Let us annihilate this tendency while we still have the milk of human sympathy running rich in our blood. Let us instill instead the spirit of humanity and the splendid potentialities that lie dormant in every otologist's heart for the uplift of the deaf child. Let us have the cooperation of the medical profession to upbuild the opportunities for the deaf and the deafened and let the larger community see what power for good our profession can really wield.

Before introducing to you the first steps in the training of the deaf child let me assume that you have never been inside of a school for the deaf and that you will now be shown the first contact between the deaf child and his teacher.

The congenitally deaf child cannot be approached by the otologist in exactly the same manner as the deafened child or the deafened adult. The means of contact are different. The deaf child who has never heard speech and who has never had any previous training cannot be mentally reached by the otologist or teacher by the same means as the hearing child is reached. The otologist is often asked by the parent of a deaf child: "Doctor, please advise me whether my child is deaf and what to do for him." Voice tests are unfamiliar sounds to such a child; the tuning forks he does not know; loud noises may be simple tactile impressions. I have often spent a period of two to three weeks, including five or six sessions of one-half hour each, trying to determine what, if any, remnant of hearing a congenitally deaf child still possesses. This is an interesting field

of study and research about which much can be said on another occasion.

Miss May Templeman's class of beginners demonstrated the first steps in producing elementary sounds as gathered from tactile impressions of the finger tips on the bones of the face of the teacher and of the individual child during the phonation of *m*. Labial sounds, trills, differences in pitch, elementary vowels, etc., followed in pedagogic order. The first principles in lip-reading were also demonstrated with these young pupils. The children were all between 4 and 6 years of age.

Dr. Goldstein then showed and explained the audiometer chart and the graph of different types of deafness.

An audiometer graph is made in the case of every pupil of the school and one of the most useful features of the audiogram is to determine whether the child still retains a remnant of hearing within the speech range (300-3000 d.v.). It is emphasized that if the audiogram indicates perceptibility within the speech range that such a pupil has a potentiality of stimulation and improvement when subjected to daily, intensified sound stimulation.

It is also of interest to note that the reactions to all of the cranial nerves are tested in each pupil with the hope that we may be able to differentiate whether a lesion of the auditory mechanism is central or peripheral. If it is found that all other cranial nerves (with the exception of the auditory) are functioning normally in a given case of profound deafness, it is almost fairly logical to assume by exclusion that the lesion is in the auditory field and not in the brain stem. If, on the other hand, in addition to a profound deafness you also have a defect in smell, in the motor muscles of the eye, or some impairment in the facial nerve, it is equally logical to conclude that there may be some lesion in the brain stem and not in the auditory field.

Each pupil is tested as to the activity of both the static and the acoustic labyrinth. Where we found that the static labyrinth, on tests by rotation or by douching, still shows a reaction and the presence of nystagmus, we are fairly safe in the conclusion that the acoustic labyrinth is not completely destroyed. If, on the other hand, there is a modicum of hearing indicating some reaction in the acoustic labyrinth and it is further found that the static labyrinth is inert, we assume that the modicum of hearing is still present, not because of the function power in the peripheral auditory mechanism, but because of some other source of sound conduction to the cnestrum that has not yet been determined.

To illustrate my point I desire to demonstrate this girl of thirteen who has an absolutely inert static labyrinth in both ears, was born deaf, but in whom we have developed quite a substantial amount of hearing.

John Tyndall, the English master physicist, made the assertion that all of the organs of special sense were simply modifications of the sense of touch. We are substantiating this from many angles in our everyday observations in the schoolroom with the deaf child. He also stated that "light, heat, sound and electricity were all modifications of a similar wave of motion and this, too, is being seriously considered in our pedagogy of the deaf child today.

Through the courtesy of the Western Electric Company, Scientific Equipment Division, there has been installed here a microphone and amplifiers by means of which we will demonstrate that even the breath sounds and the lowest spoken speech elements can be heard in the remote corners of this auditorium while the children with their immature voices speak through the microphone.

Dr. Goldstein then gave a brief report of the functional tests, audiogram, clinical record and personal history of each pupil presented.

Miss Templeman demonstrated an older class of pupils. These children are doing sixth grade work, were asked questions about the capital of New York State, the population of New York City, geographical position and other data comprehensible to the normal child doing sixth grade work.

Dr. Goldstein then demonstrated a boy of 10 years, who had been diagnosed as an aphasic, but on closer examination after entrance to Central Institute, it was found that he had a marked defect in hearing. This pupil had been intensively trained so that now he could hear fluent speech at about 2 feet from the ear. This was an illustration of some of the errors in diagnosis that the neurologist occasionally inflicts on the otologist and which can be corrected by careful pedagogy.

In citing John Tyndall's theory of the co-relation of the sense organs, I wish to emphasize the importance of sense training of every type. At Central Institute, we are trying to co-relate the sight sense, the touch sense, the hearing sense, even when only remnants are present and memory and the association of ideas that complement these special sense-organs, psychologically and pedagogically.

We have incorporated all forms of sound stimulation into a wider and more comprehensive term and developed this larger field into a new system of teaching which we call "The Acoustic Method."

My definition of the Acoustic Method may be summarized in the following:

The Acoustic Method is a form of special pedagogy applied in the education of the deaf child in which every phase of sound is utilized for stimulation and education. The principal active factors applied in this pedagogy consist in the use of the human voice, various types of musical instruments (*e.g.*, piano, organ, cello, bells, etc.), electrically activated tuning forks and, eventually, sound-amplification as developed through telephone, phonograph and radio.

The human voice is the most selective form of musical instrument for sound-stimulation in this pedagogy, but there are so many variations in quality and quantity of sound production in the use of the human voice and its amplification often is so limited that it cannot be used for constant daily stimulation without serious wear and tear on the part of the teacher.

We have developed at Central Institute for the Deaf a graduated system of exercises and have set forth the details of the Acoustic Method pedagogically in a monograph which is at the disposal of all teachers of the deaf who undertake this special stimulation.

Since the advent of the radio and the perfection of long-distance telephony, the amplification of the human voice may be so perfectly controlled that its application adds many new features as a stimulating agent in the conduct of this method.

In addition to voice stimulation, there should be prominently emphasized the importance of training the deaf child in accent, pitch and rhythm. The instrument of choice for this work is the piano.

Miss Leila Raney demonstrated with a group of children around the piano the special steps developed in the production of pitch, accent and rhythm.

DR. GOLDSTEIN: I wish to emphasize the fact that we urge the beginning of training of the deaf child at as early an age as possible. His actual pedagogy may begin at 3 years of age. He has the same instinct and desire to express himself in some form of speech contact as the normal child. Psychologically these instincts dominate in the deaf child at practically the same period as they do in the normal child.

The congenitally deaf child is frequently referred to as "deaf and dumb." Dumbness is not a pathological entity and is only a consequence of the child's deafness and his inability to imitate the sounds of the human voice. Every congenitally deaf child has the potentiality of speech.

Speech in the deaf child, unless a sufficient remnant of hearing is pre-ent, must be mechanically produced. We are now in a position to demonstrate the fact that this form of mechanical speech in a child with profound deafness may be so perfectly produced that pitch, volume, inflection, fluency and quality are brought forth so that the speech of the deaf child becomes intelligible, pleasant and almost normal even to the untrained ear.

Another observation to be emphasized is the fact that if the congenitally deaf child is not taught by speech methods until after he is 8 or 9 years of age, there may already be present a beginning ankylosis of the speech mechanism and a beginning atrophy of the intrinsic muscles of the larynx. When such pathological handicaps exist, the opportunity for development of normal speech production in the deaf child is materially lessened. We urge, therefore, that the deaf child be sent for special training as early as possible. At Central Institute, we admit them for instruction as early as three years of age.

Referring again to the Acoustic Method, it is interesting to recall that the evolution of this special form of sound stimulation must be credited to the orological profession and not to the pedagogues of the deaf. The eminent French otologist, Itard, was the first to suggest sound stimulation where partial deafness existed in the pupil. In 1805, Itard began his acoustic practice with bells, the rhythmic beat of the drum, the sustained notes of the flute and, finally, elementary sustained vowels of the voice. In 1832, Blanchet and Deleau declared themselves in favor of such acoustic exercises in the education of the deaf. Beck, Jager and Wolff interested themselves in this special phase of training in Germany. In England, Töynbee and Wilde took up this question.

The most important accomplishment in this field in its evolutionary period must be credited to Urbantschitsch, of Vienna. In 1893, Urbantschitsch demonstrated before the Vienna Medical Society a group of deaf children trained under his supervision by the teachers of the Döbling Institute for the Deaf. I recall the interest of the assembly on this occasion, the skepticism of several distinguished authorities, the challenge of the status of total deafness of the pupils demonstrated, the refutation by Urbantschitsch in his determination of complete deafness preceding the period of practice, the excellent response of the pupils themselves and the general impression and conclusion by doctors and teachers present of the value of this work.

In April, 1897, I demonstrated the results of two years' work with the Urbantschitsch auricular exercises before the American Academy of Ophthalmology and Oto-Laryngology in St. Louis and for over twenty-five years since I have been engaged in the endeavor to formulate a distinct method of acoustic stimulation and to present it in such a practical and pedagogic manner that it may be accessible to teachers of the deaf everywhere.

Today the Acoustic Method, as the result of these various evolutionary changes, its critical analysis, its systematic production, the employment of sense training, the inclusion of pitch, accent and rhythm work with the piano and stimulation by phonograph, telephone and radio, has become a surprising and formidable factor in the education of the deaf child. We are still hovering over the threshold in the development of this special training and I predict splendid accomplishment in its further development.

Even if we deal with a remnant of hearing in a deaf child and accomplish the limited step of securing a differentiation of pitch of voice, we pass an important milestone in the speech training of that particular pupil, for this pitch differentiation alone will greatly assist the teacher in overcoming in that pupil the peculiar monotone and wooden character that has been so much in evidence in the speech of the deaf.

I point with justifiable pride to the teaching staff which we have developed at Central Institute for the Deaf. Our teachers are the product of our own Normal Training School and our entire staff of twenty-one teachers have been carefully trained, not only in the principles and practice of special pedagogy for the deaf, but they are conversant with the anatomy and physiology of the speech mechanism and the hearing organs and most of them are as familiar with the organ of Corti under the microscope as are our post-graduates in medicine, including many otologists.

I say deliberately: There are but two thoroughly organized, systematically conducted Normal Training Schools for oral teachers of the deaf in America holding to a curriculum which is thoroughly adequate,—one is the Clarke School at Northampton, the other is Central Institute for the Deaf in St. Louis, and I heartily endorse the statement of Dr. Caroline Yale, the eminent principal of Northampton: "If you want to produce better speech in deaf children, train your teachers with better qualifications for this important work."

In our regular and post-graduate normal training classes during the past ten years, Central Institute for the Deaf has taught over

four-hundred teachers, offering them such modern pedagogic data as we have been able to gather in our observations of the deaf child. We consider our training school one of the most important machines for the advancement of the education of the deaf, for these teachers radiate to every school from Maine to Florida and from coast to coast and our work has even been carried back by able exponents to Mexico, Canada and England.

I have emphasized the importance of sense training as a part of the education of every deaf child and I wish to demonstrate to what degree sense training can be made practically applicable. To educate tactile impressions to a high point of efficiency is simply to practically corroborate the thought of John Tyndall that "all organs of special sense are but modifications of the sense of touch." Professor Gault, of Northwestern University, in Chicago, demonstrated on normal university students that the touch sense could be educated to receive impressions of spoken words and in the course of some months a group of such students were able to differentiate some twenty-odd words spoken through a long-distance speaking tube and received by them as tactile impressions on the hand and fingers encased in a sound-proof box.

We will demonstrate a more advanced accomplishment in a young deaf girl of 9 years of age. Marie is totally deaf and her audiometer record is here for your inspection. For these experiments I have used a large simple megaphone such as used by cheer leaders and baseball announcers. Over the large end of the megaphone a disk of heavy Whatman paper is tightly stretched. The teacher speaks through the mouth-piece of the megaphone. The pupil touches the drumhead of the megaphone lightly with the finger-tips. The pupil's eyes are blindfolded so that she cannot read the teacher's lips. The experiment begins with elementary voice sounds and continues through various stages until we reach the production of complete sentences. In this experiment we develop every pedagogic accessory, including sight, memory, speech and association of ideas.

Miss Gladys Arnold demonstrated the megaphone experiment in tactile impressions of speech with little Marie Tilson. The demonstration was begun by a differentiation of elementary vowel sounds *ä, o, a, e, oo*. Differentiation of pitch of vowel elements. Reproduction of trill, guttural, labial and other sound combinations. Individual words, such as *mother, paper, railroad, teacher*. Geographical names, *New York, St. Louis, Chicago, Philadelphia*. Proper names, *Dr. Goldstein, Miss Arnold, Miss Connery, Dr. Wendell Phillips* (a name just given to the child and differentiated in con-

junction with other names of this group and given in unexpected series).

Finally, a group of fruit charts were exhibited on a rack. The teacher spoke into the megaphone: "Show me some apples," and the pupil promptly pointed to the chart with apples and pronounced the sentence, "Give the bananas to Dr. Goldstein." The act was carried out and the sentence spoken. "Place the oranges on the table." "Give the grapes and the bananas to Dr. Wendell Phillips."

In conclusion, I think you will agree with me that some of the demonstrations and experiments which we have presented to you tonight offer an unlimited field for research and much food for reflection. The future of the speech-trained deaf child is no longer in the balance and from now on there should be the most encouraging and helpful evolution in his pedagogy.

A CORRECTION.

On page 934 of the December, 1925, issue of *THE LARYNGOSCOPE*, in an article by Dr. E. Lee Myers, the following correction is made:

Paragraph 4 reads "Mar. 24, consulted her physician, Dr. R. Emmett Kane, who did no instrumentation." This should have read Dr. R. Emmet Owen.

AMERICAN BOARD OF OTO-LARYNGOLOGY.

An examination will be held by the American Board of Oto-Laryngology in Dallas, Texas, on Monday, Apr. 19, 1926, and in San Francisco, California, on Tuesday, Apr. 27, 1926.

Application should be made to the Secretary, Dr. H. W. Loeb, 1402 South Grand boulevard, St. Louis, Missouri.

ATYPICAL CASE OF ACUTE OTITIS MEDIA.

1. Case of Acute Otitis Media and Uremia.
2. Case of Acute Otitis Media Accompanied with Paralysis of the Facial Nerve.
3. Case of Acute Mastoiditis with Late Labyrinthitis.

DR. MYRON METZENBAUM, Cleveland, Ohio.

ACUTE OTITIS MEDIA AND UREMIA.

The acute inflammations of the middle ear are characterized by greater or lesser active inflammatory symptoms (fever, pains), inflammatory hyperemia of the mucous membrane of the middle ear and of the ear drum with a serous or bloody exudate, muco-purulent or purulent secretion in the middle ear cavity. This inflammation usually runs a typical course and subsides within a period of about four weeks.

However, the otitis may run a typical course and complications may still develop within this four-week period or thereafter. Within the first few hours following the onset of the inflammation in the middle ear, the person may suffer from boring or cutting earache, and a rise in temperature. These symptoms are usually aggravated during the night. The pains often radiate over the side of the head, sometimes toward the eye or into the teeth.

As a result of this, the general condition of the patient suffers, his facial expression changes, he looks pale; his tongue becomes coated and he loses strength rapidly. Soon thereafter he develops some difficulty in hearing in the diseased ear, accompanied by annoying subjective noises or tinnitus. The severity of the disease as well as its stormy or mild development depends upon the type and the virulence of the infecting organism and also upon the resistance of the patient. The streptococcus seems to be the most harmful infection. Sometimes, the periosteum of the mastoid just back of the attachment of the ear, is sensitive to pressure as early as on the second or third day. This acute irritation of the periosteum indicates an inflammation of the mucous membrane of those pneumatic spaces which are in close relation to the periosteum of the mastoid. There may result a swelling of the glands of the mastoid and of the large glands in the retromaxillary fossa so they can be felt. A probable toxic irritation of the meninges close to the mastoid may develop, especially in children; namely, when both ears are simultaneously involved. This meningeal irritation is manifested by somnolence, delirium, boring of the head into the pillows, and may

*Read before the meeting of the Academy of Ophthalmology and Otolaryngology, Chicago, Ill., Oct. 21, 1925.

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be accompanied by vomiting and even general convulsions. All of these acute symptoms may subside or may increase until the inflammatory secretion causes a spontaneous rupture of the eardrum or evacuates through a paracentesis.

There are infections of such a high grade virulence, especially some of the streptococcic strains, which within the first few days of the disease of the middle ear invade the lymphatics or the blood stream, or both, and may lead to local or general complications.

The following is the report of a case of acute otitis media in a man, which within the first few days led to a rare complication, namely, an acute hemorrhagic nephritis with uremia.

The patient, a man aged 36 years, never before had any ear trouble. Following a severe coryza, he developed very acute pains in both ears. I was first called to see the patient during the evening of Mar. 31, 1925, and found a very sick-appearing man lying in bed, and obtained the following history from the family:

On Jan. 26, 1925, seven weeks previous, the man was held up and shot through the right lung. He was cared for at Charity Hospital and dismissed as cured in February. A later examination of the hospital records revealed the fact that during the period, the patient was in bed, he could not urinate and was catheterized, but as soon as he was able to leave the bed he urinated naturally. Frequent urinalysis while in the hospital always showed the urine as normal. From this, we may conclude that a kidney infection or inflammation did not exist at this time.

The patient was sick in bed for three days with an acute cold in his head, accompanied by violet pains in both ears and absolutely unbearable headaches, had dizziness, nausea, constant vomiting, a moderate spontaneous nystagmus to both sides, and temperature, 38°. Both eardrums were swollen, red, bulging, no details discernible. There was a slight serous transudate. Hearing in both ears seemed obtunded. The patient was dull and somewhat lethargic. Both mastoids were somewhat sensitive on pressure.

Under cocain-adrenalin a large paracentesis was made through both eardrums, evacuating creamy pus under pressure from both sides. Within a few minutes the patient sat up in bed, acted somewhat brighter, said his pains were less and that he felt relieved.

The next morning the examination gave the following: both mastoids very sensitive to pressure. A very mild, spontaneous nystagmus, hearing dull. During the examination violent vomiting. The patient complained of such violent headaches that he tossed around in bed, boring his head into the pillows. The nurse stated that he had not urinated but may have passed urine during his bowel movements.

Apr. 2: Very restless night. Continuous vomiting. Because his headaches were so very violent, his house physician kept him under control with morphin. Both ears discharged thick, creamy pus. Patient passed a small quantity of bloody urine.

Apr. 3: Temperature normal. Pulse 80. Profuse discharge of pus from both ears; continuous vomiting and unbearable headaches. On catheterization $2\frac{1}{2}$ ounces of urine were withdrawn, which appeared macroscopically to be mixed with blood. The patient's face and neck were definitely swollen and edematous.

At first the vomiting, unendurable headaches and nystagmus were considered as symptoms of a beginning intracranial complication. However, when added to these symptoms there developed a suppression of the urine and edema of the hands and face, the diagnosis was changed to one of uremia and the patient was transferred to the Hospital Clinic, where Dr. A. S. Maschke found the following on physical examination.

Apr. 4: Slight edema around the eyes. Pin-point pupils. No nystagmus. No rigidity of the neck. No Kernig. Pulse slow—pressure 140/180. Reflexes deep and superficial, all positive. Headache is frontal. Nausea and vomiting. Urine sparse, presence of red cells in urine important. Disagreeable breath.

Diagnosis: Uremia.

Treatment: Sweats, Fisher's solution per rectum, also hot colon irrigations. Cereal diet. Keep patient warm at all times.

Apr. 4: Temperature normal. Pulse 84. Very thick, creamy secretion from both ears. Headaches and vomiting less violent.

White count: 13,400.

Urine: Albumin 4+; many red blood corpuscles, moderate number of pus cells, many coarse granular casts. Blood area, 60 milligrams per 100 c.c.m. According to the Folin-Youngsberry method, 10 to 15 milligrams per 100 c.c.m. is considered normal. Pus from the ear shows many long chains of streptococci. Intake, 2210 c.c. Output, 250 c.c.

Apr. 5th: Temperature 36.6°. Pulse 68. Swelling around the eyes. Edema both legs. Headaches less violent. Vomiting has nearly ceased. Very profuse purulent discharge from both ears. Loud tinnitus. Hard of hearing in both ears. Blood Wassermann negative.

Apr. 7: Temperature 37.2°. Pulse 84. Vomited only once today. Headaches almost disappeared. General condition much improved. The ear discharge lessened.

Apr. 9: General improvement slight. Secretion from both ears. Mild headaches. No vomiting. Edema of the limbs gone, but edema of the face still present.

Urine: Albumin 2. Sugar negative. Many red blood corpuscles, moderate number pus cells, many bacteria. Blood-urea 42 milligrams per 100 c.c.m. blood. Esbach $2\frac{1}{2}$ grms. in 24 hours specimen. Intake 1390 c.c. Output 1240 c.c.

Apr. 10-16: General improvement in the kidney symptoms as well as the ear symptoms.

Apr. 16: Only a slight discharge. No more vomiting and headaches. Tinnitus lessened.

Urine: Albumin 1+. Moderate number pus cells and red blood corpuscles. Esbach $2\frac{1}{2}$ grms.

Apr. 20: Patient was permitted to sit in a chair. Temperature and pulse normal. Only a very slight secretion from both ears. Subjective finding very good.

Urine: Albumin negative. Urinary output normal. Blood-urea 16 milligrams per 100 c.c.m., which was now down to normal.

Apr. 21: Patient was sent home from the hospital.

SUMMARY.

This case is one of a man, age 36 years, who on the third day of his acute otitis media, even before the eardrums had reached a stage when they ruptured spontaneously, manifested an acute and severe kidney complication. This acute suppression of the urine seems to have no relation to the difficulty the patient experienced in urinating during the time he was in the hospital, seven weeks previous, suffering from the penetrating shot through his lung. During this time, the patient could not urinate while lying in bed, but could urinate when he was permitted to sit out of bed, and also the frequent urinalyses were always negative. The present acute suppression and uremia is simultaneous with and seems to have resulted from the toxemia of the absorption of the virulent infection from the double otitis media, which did not begin to evacuate pus until after the paracentesis was performed on the third day. If we consider his present condition, a toxemia resulting from a severe general infection originating in the middle ear, then we should consider two other contributing factors. First, that the eardrums did not rupture spontaneously but that the pus was first evacuated on the third day after a double paracentesis and, secondly, that the patient's vitality must have been lowered by the wound he received seven weeks previous.

This patient, with an intracranial as well as severe general condition improved gradually under conservative treatment until he was restored to his former state of health.

A CASE OF ACUTE OTITIS MEDIA ACCOMPANIED WITH PARALYSIS OF
THE FACIAL NERVE.

A woman, age 50 years, consulted me at my office for the first time on Dec. 26, 1924, with the history that for the past two days, following an acute cold in her head, she developed acute and severe pains in her right ear.

Examination: Temperature 37.5.° Pulse 92. The entire right eardrum very red, swollen, with definite bulging in the superior posterior quadrant. All details of the drum had disappeared. The mastoid was slightly swollen and very sensitive to pressure.

Treatment: A large paracentesis was made under local anesthesia and was followed by a discharge of blood and serum. The patient was put to bed and had the usual general treatment. Two days afterwards, on Dec. 28, the discharge lessened, the pains increased and a second paracentesis was performed. The day following, there was a profuse purulent discharge, but with increased pain on pressure over the mastoid, and an impression of beginning facial paralysis. On the following day, Jan. 1, 1925, which is the fifth day after the paracentesis and the ninth day from the beginning of any of her symptoms, she developed a complete paralysis of all the three branches of the facial nerve. The patient was transferred to the Hospital Clinic for immediate operation.

White count: 16,200.

X-ray Right Mastoid: There was a definite diminution of the air content of all the cells and especially that of the antrum. The intercellular septa were fewer in number than on the left side. There was no evidence of any destruction of the cortex. The posterior mastoid cells were very large and overlapped the sinus.

X-ray Left Mastoid: Normal.

The X-ray findings indicated a mastoiditis on the right side, with partial destruction of the intercellular septa.

Operation: Under gas-ether anesthesia, the usual retroauricular mastoid incision was made through tissues which were somewhat edematous. The mastoid cortex appeared normal. On removing the outer layer of the cortex, thick, creamy pus welled out under pressure. The mastoid was of the pneumatic type, the cell walls partially intact and the cells filled with pus and necrotic granulations. There were a large number of retrofacial necrotic cells filled with granulations; also, large necrotic periantral cells. When the antrum itself was opened, thick, creamy pus, under considerable tension, welled out. A wide opening was made into the antrum.

The cells covering the sinus as well as the tegmen tympani appeared normal. A light iodoform gauze drain was inserted and the wound was left wide open.

On the second day, following the operation, there was an impression that the facial nerve was recovering, and on the fourth day, the patient could partially close her right eye. The drooping of the mouth was less apparent and she could wrinkle her forehead slightly. The improvement was gradual and continuous. The patient left the hospital in two weeks and at the end of the fourth week, the wound was completely healed, the ear was dry, and all three branches of the facial nerve had fully recovered.

SUMMARY.

This is a case where a woman, age 50 years, developed a complete paralysis of the facial nerve on the ninth day following an acute otitis and on the fifth day following the paracentesis. The paralysis of the facial nerve was a definite indication for the immediate operation. The opening of the mastoid and the draining of the antrum seems to have made it possible for the facial nerve to recover itself.

The explanation for the development of the facial paralysis so early in a case of an acute otitis media may be due to a collateral swelling or a toxemia of the facial nerve coming from the retro-facial cells which were necrotic, filled with pus and granulations, and which lie just beneath the facial nerve and are separated from the nerve by only a thin layer of bone.

CASE OF ACUTE MASTOIDITIS WITH LATE LABYRINTHITIS.

A young woman, age 19 years, consulted us at our office for the first time on Saturday afternoon, June 14, 1924, and stated that three weeks previous, following an acute attack of tonsillitis, she developed a severe pain in her right ear, followed by a spontaneous discharge of pus, since which time she was under the care of her family physician.

Examination: Left ear normal. Right ear: definite swelling over the entire mastoid and very sensitive to pressure. The outer ear canal normal. A profuse, creamy, pulsating discharge came from a perforation in the posterior-superior quadrant. Definite bulging of the posterior-superior canal wall.

Functional Tests: Weber: Lateralized to the diseased ear. Rinne: Negative. Conversational voice heard about 3 feet.

Symptoms: Severe headaches over the entire right half of the head. Also, severe pains deep within the ear. Temperature 37.5°.

X-ray Examination: Made at that time and interpretation of the still wet plates revealed a clouding of all the mastoid cells. This clouding extended over the zygomatic cells. The cell walls seemed mostly intact.

Impression: This patient had an acute mastoiditis with possible complications, indicating an immediate operation.

She refused to go to the hospital until after Sunday. On Monday afternoon, June 16th, the patient went to the Hospital Clinic for operation. At this time, the swelling over the mastoid had increased as well as the pressure pains symptoms.

Leucocyte count: 12,200. Temperature, 37.5°. The operation was performed the same afternoon under gas-ether anesthesia.

Operation: The usual retroauricular incision was made through swollen and edematous tissues. The cortex of the mastoid appeared normal and no fistula of the cortex was found. Upon removal of the first cortical layer, thick, creamy pus came out under pressure. On opening the antrum itself, creamy pus again came out under pressure. The mastoid cells were necrotic, filled with pus and granulations, as well as the cells extending up to the zygomatic process. The tip of the mastoid was necrotic and was removed. The bone covering the sinus was necrotic and there was a small perisinus abscess. The wall of the sinus was covered with granulations and thickened and therefore the sinus was freely exposed above and below until it appeared normal, and the flow of blood through the sinus felt quite normal. There were cells posterior to the sinus which were necrotic and filled with granulations. The tegmen tympani appeared normal. A light iodoform gauze packing was inserted and the wound left wide open. The temperature remained practically normal. On the fifth day, the packing was changed, and every second day thereafter. On the tenth day following the operation, a swelling developed in the zygomatic region, which gradually disappeared after five days.

Three weeks after the operation, the patient left the hospital. The ear was dry, the mastoid wound healed and the functional tests good.

On the evening of July 16, one week after leaving the hospital, and exactly one month after the mastoid operation, I was called to the patient's home and told that during the night she developed a high fever, combined with very marked dizziness and violent vomiting, which she attributed to the eating of a large quantity of cherries before retiring. She was lying on her left, or healthy side, complaining of severe headache, dizziness and nausea. Her eyes showed a most violent spontaneous, horizontal rotatory nystagmus of great amplitude and frequency to both right and left and she had a definite past-pointing to the right with both hands. No meningeal symptoms. Temperature, 37.5°. Pulse, 90.

Impression: Patient had developed acute labyrinthitis. She was immediately transferred back to the hospital, an ice-cap put over the right side of her head, and absolute rest ordered.

Examination the following morning: Temperature, 37.2°. Pulse, 84. Tongue moist. Violent headache. Marked nausea. No vomiting. Patient was lying on her left or healthy side. She said she could not lie on her right side because it made her dizzy and caused vomiting. No secretion from the middle ear. The drum normal. Slight sinking of the posterior-superior canal wall. A slight secretion through the mastoid wound. The region around the mastoid and zygoma sensitive on pressure. No meningeal symptoms.

Functional Tests: Weber: Heard in both ears, but more often referred to the left or well ear. With Barany's noise apparatus in the left ear, loud-spoken words were still heard by the right ear. The small, a-1 (Stenger's) tuning fork could be heard by the right ear. The deep-C₄₄ fork and the high-C⁴ fork were definitely heard.

Eyes: Spontaneous horizontal and rotatory nystagmus to both right and left of great amplitude and frequency. Typical past-pointing toward the right with both hands. No caloric tests were made in view of the fact that the patient unquestionably heard with her right, or diseased ear. The patient was kept at absolute rest with an ice-bag over the right side of her head and mastoid.

July 18: Temperature, 37.1°. Pulse, 96. Very restless night, yawning frequently. Continuous nausea but no vomiting. Moderate degree of headache. No discharge from the ear. Slightly increased serous discharge from the old mastoid wound. No meningeal symptoms.

Functional Tests: Weber: Could not be definitely determined, but more often lateralized toward the well than the diseased ear. With a Barany apparatus in the well ear, loud-spoken or shouted words could not be heard by the diseased ear. The small a-1 fork was not heard. This gave the impression that the disease had progressed and resulted in a deafness in the right ear. This was 60 hours from the onset of the attack.

Eyes: Horizontal-rotatory nystagmus to both right and left, of lessened degree and frequency, somewhat stronger toward the left than the right. Past-pointing—with the right hand definitely to the right; with the left hand still toward the right, but in a lessened degree. The patient still preferred to lie on her left, or well side.

July 19: Temperature, 37.1°. Pulse, 96. General condition improved. Headaches disappeared. The secretion from the mastoid wound practically ceased.

Functional Tests: Weber: Could only be heard in left, or well ear. All tests pointed to absolute deafness in her right ear.

Eyes: The nystagmus toward the left side of less intensity and less frequency. The nystagmus toward the right side absolutely gone. Past-pointing with the left arm.

Caloric reaction: With the patient lying flat in bed, the right ear canal was irrigated with 2 quarts of cold water at 20° C. without causing any increase of the existing nystagmus of the second degree to that of the third degree.

July 20: Temperature, 37.° Pulse, 80. No headaches. Very slight nausea. Right ear absolutely deaf. Past-pointing and nystagmus remained unchanged. Irrigation of the right ear with 2 quarts of warm water at 43° C. did not diminish the existing nystagmus to the left.

From these findings, we concluded that the right labyrinth was without reaction to cold or warm water.

July 21: Temperature, 37.° Pulse, 96. General condition good. Nausea ceased. The spontaneous nystagmus definitely weaker. First degree.

July 23: Temperature, 37.° Pulse, 96. General condition good. Spontaneous nystagmus very weak.

July 24-28: During these four days, the patient's general condition improved and she felt comfortable as long as she remained lying on her left or well side. The nystagmus was lessened both as to frequency and degree. Past-pointing of the right arm was still typical. The left arm no longer past-pointed.

July 30: Temperature, 36.° Pulse, 76. General condition normal. Nystagmus of the second degree toward the left side had lessened to that of the nystagmus of the first degree only.

Aug. 1: Temperature, 37.° Pulse, 76. General condition good. Nystagmus lessened and at times did not exist.

Aug. 3: Past-pointing with the right hand at times only. Nystagmus toward the left only.

Aug. 7: The patient was permitted to sit up for one hour. No reaction.

Aug. 8: Patient out of bed. Very slight nystagmus toward the left side.

Aug. 9: Nystagmus had entirely disappeared. The patient was transported home for convalescence.

SUMMARY.

This case is one of a young woman without any previous ear involvement, who developed a tonsillitis, followed by an acute otitis

media with a spontaneous rupture of her right eardrum. After three weeks of purulent secretion from the ear, she developed a mastoiditis, which was operated. Ten days after the operation, there developed a slight swelling over the zygomatic region, which subsided after five days. From this time on, the patient made an uneventful recovery and left the hospital at the end of the third week with a dry ear and a healed operative wound, and good functional tests.

During the night of the seventh day after leaving the hospital, which was four weeks following the mastoid operation, she developed an acute fever with great dizziness, followed by nausea and vomiting, which she discovered was increased by lying on her operated, or right side. The examination revealed a dry ear, with slight serous discharge from the former mastoid wound. Her eyes revealed a violent horizontal-rotatory nystagmus to both right and left with very great dizziness, nausea, vomiting and past-pointing with both arms toward the right. The hearing was still normal in the diseased ear. Under our observation, within a period of 48 to 60 hours, the patient developed absolute deafness and loss of the caloric reaction in her right ear.

The vital question for decision was now to determine what course to pursue, whether conservative or operative; if operative, it would mean opening of the labyrinth. According to Ruttin, in his book on "Diseases of the Labyrinth," he says "shall we open the labyrinth or not in a case of diffuse labyrinthitis with complete loss of function?" In the beginning, we did not know whether we were dealing with a case of purulent or only with a case of serous labyrinthitis. Therefore, he advises waiting to see whether the symptoms become aggravated or whether they subside.

The differentiation between serous labyrinthitis as distinguished from a diffuse purulent labyrinthitis can be established only, if it can be established with certainty at all, by the functional tests. As long as any labyrinth function (hearing, caloric, or turning reaction) can be demonstrated, we must assume that the case is still a serous and not a purulent labyrinthitis, although Voss has described cases of serous induced labyrinthitis with complete loss of all functional reactions. In case of serous induced labyrinthitis there follows a direct non-purulent inflammation through the labyrinth-wall; more often there is only a collateral edema. Ruttin states that "as a rule a labyrinthitis arising in the course of an acute otitis, as contrary to a chronic otitis, is more often only serous in type." In our case, we decided to await further developments. First, we were dealing with a case of labyrinthitis coming on as a late complication

to an acute mastoiditis and, secondly, as the deafness became absolute and the caloric reaction disappeared in the diseased ear, the patient felt subjectively better. Her headaches had left, her dizziness was only very mild, her vomiting entirely gone, her nystagmus very much less, and there were no meningeal symptoms.

With absolute rest in bed and an ice-bag over her head, the labyrinth symptoms subsided gradually until at the end of three weeks the patient left the hospital feeling well, free from all dizziness, nausea, vomiting or nystagmus, but absolutely deaf in the diseased ear.

Eight days later ear tests were made with the following results: The right middle ear dry and the mastoid wound healed. Turning ten times to right and left, normal reaction. Caloric reaction of the right labyrinth had returned. Hearing on the right side absolutely gone. In this case the auditory, which are the more sensitive fibres, were totally destroyed, while the vestibular fibres recovered. In confirmation of the diagnosis of serous induced labyrinthitis is the return of the caloric reaction.

Two months later she again developed an acute tonsillitis, followed by a discharge from the right ear, which subsided in a few days. Under local anesthesia the tonsils were enucleated without any special reaction and she left the hospital after two days. Periodic examination of the patient up to October, 1925, fifteen months after her operation, reveals an absolute deafness of the right ear, with normal labyrinthine reactions. The ear is dry and the wound healed.

For the above reasons we conclude that this was a case of serous induced labyrinthitis, following an acute otitis and simple mastoid-operation, which recovered as to life under conservative treatment, excepting for the resulting absolute deafness in the right ear, and is well, and after fifteen months manifests no further intracranial complications.

We wish to draw attention to a symptom which the patient manifested and which is seen in many patients who develop an acute labyrinthitis, namely the "forced position" taken by the patients for their comfort. The patient prefers to lie on the side of the good, or well ear. This corresponds to the quick component of the nystagmus. For example, a patient with a right labyrinthitis lies by preference upon his left side. This is according to Ruttin, manifestly to be explained by the fact that in this position the patient reduces his field of vision, and thereby lessens the extent of the apparent movements.

736 Rose Building.

NEW RHINOPLASTIC INSTRUMENTS.

DR. MAXWELL MALTZ, New York City.

Endonasal rhinoplastic surgery has within recent years been receiving considerable attention from the rhinologist, though these procedures are twenty years old. And efforts have continually been made to perfect these endonasal procedures with the idea of minimizing the possibility of disconcerting post-operative results. And this naturally depends upon simplifying the instrumentarium and the operations that the latter be under better control of the operator. In a following article the author will give a detailed and illustrative report concerning endonasal rhinoplastic surgery and will include his own methods of correcting hook nose and crooked nose deformities, but the purpose of this paper is to briefly illustrate the new and modified instruments that the author has devised and found to be of considerable advantage.

Fig. 1 is the author's saw used for the correction of hook nose deformities. Right and left are made. After an oblique incision is made at the lower margin of the triangular cartilage, between cartilage and skin, the skin, then periosteum are elevated from the nasal bone. This procedure is done on both sides, and after both nasal bones are liberated from the skin and periosteum, the saw is inserted into the nose through the incipient line of incision and the redundant part of the bone and cartilage comprising the hook is removed. The advantage of this saw is that it has a support for the index finger and for the palm of the hand, rendering the procedure of sawing more effective and less tiring to the surgeon. After sawing to the medial line with the right saw the same procedure is done from the left side with the left saw until the hook is completely removed.

Fig. 2 illustrates the author's saw used in the correction of crooked nose deformities. A crooked or obliquely deformed nose has a broad side and a narrow side, and in correcting this type of nose, a triangular piece of bone from the frontal process of the superior maxilla is removed from the broad side of the deformity, and then both nasal bones are fractured to the medial line. An incision is made laterally in the lowermost part of the apertura piriformis, and skin and periosteum are elevated from the frontal

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process. This procedure is duplicated on the other side. On the broad side of the deformity where bone has to be removed, the periosteum is also raised from the inner nasal side of the frontal process. With the saw (Fig. 2) the surgeon saws through the "cheek-nose" border line on the narrow side, and then a triangular piece of bone is removed from the broad side of the crooked nose. After these procedures the nasal bones are fractured toward the medial line. The advantage of this instrument is that it has a powerful handle slightly bent in the direction in which the surgeon saws. An added support is attached to the angle where saw and handle meet. This prevents undue bending of the instrument, and as a result the sawing is more effective and less tiring to the surgeon.



Fig. 1. Saw for Hook Nose Deformity.



Fig. 2. Saw for crooked nose deformity.

One of the untoward complications following the operations on the hook nose or crooked nose is the production of a periostitis or subperiosteal abscess in the region of the upper part of the frontal process. And this, in the majority of cases is attributable to the lodgment of small particles of bone in torn periosteum or mucosa following the use of the saw, or the rasp, to remove bony prominences. The trouble with most rasps is that they neither have enough space between the teeth nor on either side of the instrument to allow for the collection of the fine granules of bone produced while using the rasp. As a consequence, these granules lodge somewhere in the torn periosteum or mucosa and act as

foreign bodies. And to gather up the majority of these fine spicules of bone, the author has perfected the rasp illustrated in Fig. 3. This instrument consists of a series of cups (also found laterally). Thus the use of this instrument will tend to minimize the chances of post-operative complications.

Often in performing the operation for correcting a hook nose there is a redundant and prominent piece of quadrangular cartilage left in the lower half of its extent, after the removal of the hook. To remove this piece of cartilage very easily, the instrument illustrated in Fig. 4 was devised. This knife has a removable pocket attached to it, and after the redundant piece of cartilage is cut, it is caught in the pocket of the knife and readily removed. In this



Fig. 3. Rasp for removing bony prominences.

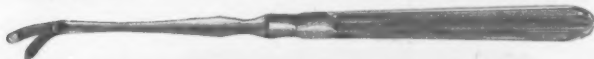


Fig. 4. Knife with pocket for removing redundant quadrangular cartilage.



Fig. 5. Double-edged plastic knife with sharp round extremity.



Fig. 6. Curved double-edged plastic knife used in correcting saddle nose deformities.

manner delay in fishing for the cartilage is avoided. The dull blade forming the pocket acts as a protection against the removal of an undue amount of quadrangular cartilage. Thus, this safety mechanism renders the instrument very useful and valuable in removing just the redundant cartilage and nothing more.

Most of the incisions for rhinoplastic work are made with a very sharp-pointed knife. But in order to prevent perforation into the skin while working subcutaneously, a double-edged knife was perfected whose tip, although sharp, is rounded and not pointed. Subcutaneous work is then a simple matter. Two models are made, one whose tip is slightly curved, the other whose tip is straight (Fig. 5).

In the correction of a saddle nose deformity a transplant is used, be it ivory, bone, or cartilage. An incision is made in the mucous membrane of the nose at the lower border of the triangular cartilage between it and the skin. The skin is raised from the under-

lying tissue, from the root of the nose to the tip, as well as the skin on the side of the nose where the primary incision was made. In order to get to the other side of the nose through this one incision, Prof. Joseph devised a curved double-edged knife, but the blade of the instrument is bulky and clumsy. The idea of this operation is to form a pocket in which the transplant can be ensconced permanently. The width of the author's blade is one-half that of the older one and thus it is not only easier to manipulate but more powerful and effective an instrument, since, while using the knife, the whole line of force is directed toward the blade. Fig. 6 illustrates this instrument. A second smaller model is made that can be used for the correction of a bulbous nasal tip.



Fig. 7. Obtuse-angled double-edged knife for bulbous nasal tip.

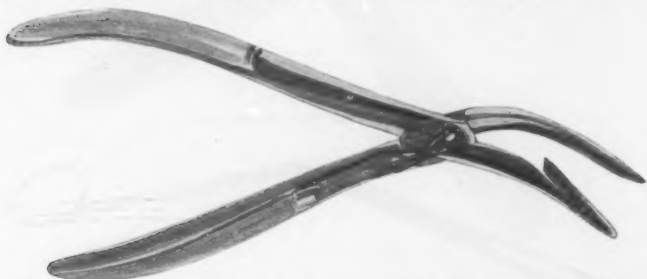


Fig. 8. Cartilage punch with basket for removing redundant lateral alar or triangular cartilage.

Fig. 7 illustrates the author's other curved double-edged knife that he employs either in the correction of a bulbous nasal tip or a "potato nose". After an incision is made in the anterior superior part of the nostril, between skin and lateral alar cartilage, the skin is elevated subperichondrally in the region of the tip of the nose. The same procedure is performed on the other side of the nose. And to make simple the procedure of raising the skin in the medial line the author's specially designed knife is used (Fig. 7). Then an oblong piece of lateral alar or triangular cartilage is removed, depending upon whether the patient has a broad tip or a "potato nose". This curved knife was purposely constructed to avoid cutting into the nostrils while liberating the skin in the medial line (a

result that occasionally follows the use of the straight knives). These unnecessary incisions leave permanent undesirable scars.

The oblong piece of cartilage mentioned above in the correction of a broad nasal tip can be effectively removed with the author's model of the cartilage punch (Fig. 8). After the skin is elevated from the cartilage, the instrument is placed between cartilage and skin, and holding the blade as far to the median line as possible, the desired amount of cartilage is removed. This punch has a basket attached to it so that the piece of incised cartilage is caught in this basket and its removal is a simple matter. By using Joseph's older model of this instrument, it is not easy to remove the incised cartilage, and one has to fish for it with forceps.



Fig. 9. Guide for transplant.



Fig. 10. Forceps for transplant.

To simplify the introduction of the transplant into the nose in the correction of saddle nose deformities, the instrument illustrated in Fig. 9 is employed. When the surgeon is ready to introduce the desired transplant, the teeth of this instrument are imbedded into the lower border of the primary incision. The handle steadies the instrument and is purposely bent to keep the left hand out of the field of operation. The transplant usually used by the author is ivory. It is readily introduced and modeled into place after grasping it with the forceps specially constructed for this purpose (Fig. 10).

Fig. 11 illustrates an instrument like that shown in Fig. 9, but minus the teeth. This is employed in the correction of crooked nose deformities. After the mucous membrane of the nose has been elevated subperiosteally on the broad side of the deformity, this instrument is introduced between mucosa and bone. When using the saw, this instrument avoids tearing the mucosa and the subsequent lodgment of bony granules in these torn areas of mucous membrane, in this way minimizing the possibility of post-operative complications.

In shortening a long nose, the skin is raised subcutaneously as far as the tip of the nose and then an incision is made between quadrangular and medial alar cartilages. A triangular piece of



Fig. 11. Mucosa protector.

quadrangular cartilage, a piece of the septum mobile, as well as a piece from each triangular cartilage is removed. And to make the apposition of both portions of the septal cartilages a quick and simple matter, the author has constructed a straight double needle (Fig. 12). This needle can also be used in the correction of a tilted tip to approximate both edges of the medial alar cartilage. The curved double needle can be employed for sewing the mucosa of the septum or of the lateral nasal fossa.

Fig. 13 is the author's handy nostril elevator. Two models are made, one to elevate one nostril, the other to elevate both nostrils simultaneously. With these instruments the hands of the assistant are out of the field of operation.

It is evident that the purport of this article does not include a discussion of the merits of endonasal rhinoplastic procedures. But

in short, the more interested the rhinologist becomes in the operative interference of nasal deformities, the more will his surgical judgment prefer these endonasal methods. After all, the avoidance of an external scar is of considerable moment, both to the patient and to the surgeon, and with proper training the results obtained with these methods are nigh impeccable. Of course, further additions can yet be made to our store of knowledge but with discreet surgical coaxing the nose can be taught to be condescending and charitable to the supplications of the operator.



Fig. 12a. Straight double needle.



Fig. 12b. Curved double needle.



Fig. 13. Nostril elevator.

These new rhinoplastic instruments were demonstrated in various rhinological clinics in Berlin, Breslau, Munich, Germany; Naples, Italy; Amsterdam, Holland; London, England; at the German Ear, Nose and Throat Congress in Munich, May, 1925, and at the International Clinic of Oto-Rhino-Laryngology and Facio-Maxillary Surgery, St. Louis Hospital, Paris, June, 1925.

These instruments are manufactured by Pfau's American Instrument Co., 2-4 East 23rd Street, New York City.

41 Fifth Avenue.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

October 28, 1925.

Memorial to Dr. Francke H. Bosworth. By Dr. D. Bryson Delavan.
(Published in the December, 1925, issue of THE LARYNGOSCOPE.)

Bilateral Branchial Fistula. Dr. Jay Dashiell Whitham.

Mrs. H., a nurse, age 38 years, was first seen on June 15, 1924, when she complained of discharging fistulas on both sides of her neck. She said that she had had this trouble all her life, the right side discharging continuously and causing much annoyance. The left side discharged only occasionally.

On examination of the neck, a small discharging fistulous hole was noted on each side along the anterior border of the sterno-mastoids and about two inches above the clavicle. A probe could be passed into each tract, but could not be made to enter the pharynx. The passage of the probe was attended by exquisite pain and spasms of coughing. The right tract was injected with barium paste, which could be seen emerging from the tonsillar sinus at the lower pole of the tonsil. An X-ray photograph was then made, which showed the tract very nicely.

Two weeks later the right tract was removed under ether anesthesia. It was first injected with a strong solution of methylene blue. A long horizontal incision was made in a natural skin furrow of the neck. The dissection was easy and the tract large and thick until the bifurcation of the carotid was reached. Here it became most tedious, as the tract was almost hair-like in thickness. The wound was closed without drainage.

It would not have been practicable to follow the method advised by some operators in this case. This method, referred to, resembles the Mayo operation for varicose veins of the leg. A filiform bougie is passed through the fistula, after the carotid bifurcation has been passed; one end is brought out through the mouth, the other is tied to the stump of the tract. By traction on the mouth-end of the bougie the tract is pulled out into the pharynx and cut off. Some operators advise removal of the tonsil, but no reason was seen for it in this case.

The case here shown was a complete branchial fistula, for it opened externally on the surface of the neck and internally into the tonsillar sinus. The anatomical relations of this type of fistula are constant. From the skin of the neck, often as low as the clavicle, it extends upward to the border of the sterno-mastoid muscle; thence it passes to the *hyoid* region, where it crosses the digastric muscle, passes through the bifurcation of the carotid artery, thence goes under the stylo-pharyngeus and stylo-glossus muscles, crossing the 9th and 10th cranial nerves, and enters the throat in the tonsillar region. A year and four months has elapsed since operation, and there has been no recurrence.

A bilateral branchial fistula is a very rare condition. In 1832, Ascheron discovered the relationship between branchial clefts and congenital fistulae. Luschka and others discovered that the cysts and fistulae appearing later in life were of fetal origin. In a four weeks' fetus, in the cephalic region, are four clefts and four arches, the anlage of the gills of fishes. Of the four clefts, only the first, the hyo-mandibular, should persist, for from this cleft develops the ear, auditory canal, Eustachian tube, etc. The other clefts should coalesce, leaving the neck smooth. Failure of the first cleft to coalesce in the mid-line, results in hare-lip and cleftpalate. Failure of the clefts to coalesce laterally results in the congenital cysts and fistulae. These are the following types: 1 complete

branchial fistula (having an external opening and an internal opening in communication; 2 incomplete external (having an external opening only); 3 incomplete internal; 4 branchial cysts (having no opening); 5 branchial dermoids.

The internal openings are in one of the following locations: 1 first pharyngeal groove, *i. e.*, entrance of Eustachian tube; 2 second pharyngeal groove, *i. e.*, Rosenmuller's fossa or the tonsillar sinus, as in the case reported; 3 a fold in front of the laryngeal nerve; 4 fourth pharyngeal groove, *i. e.*, the pyriform sinus.

Cysts may also form from the posterior end of any of the three last-named clefts, resulting in cervical auricles or rudiments of cartilage in the neck.

Irrigation of the Sphenoidal Sinuses (Lantern Slides). Dr. A. Lobell (by invitation).

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. MACKENTY said he had the good fortune to have Dr. Lobell in his clinic, and he had shown an usual industry and care in the preparation and presentation of this presentation. He had worked out the technique with care and it was a contribution to our diagnostic equipment when carried out as Dr. Lobell suggested. Of course it has to be carried out in that way or not at all; in the careless hands it would not be safe, but with the safeguards with which Dr. Lobell has outlined it is perfectly safe. He has used it very effectively in the clinic.

DR. LEDERMAN said that this was one of the most practical and useful procedures that had been presented before the Section for a number of years, and from the manner in which it had been submitted, although having had no practice with the instrument, it was difficult to see why it would not be a perfectly safe procedure.

DR. MYERSON expressed his agreement with the previous speakers that the idea was a most valuable contribution, but he wished to add a word of caution from the standpoint of its being universally accepted. Anyone who had had any experience with the anatomy and operative work on the posterior sinuses would know that the 9 m.m. extension referred to is too long; in his opinion, the guard was not sufficiently large to prevent its entering the larger cells because the anterior wall of the sinus is usually quite fragile. Furthermore, it is not uncommon to find a sphenoidal cell extending far over to the other side; it is not a rare occurrence, but rather a frequent one.

As a diagnostic aid, the method could be valuable, but as a therapeutic measure it is not so useful. The reader of the paper speaks of its great utility in the diagnosis and treatment of sphenoidal disease when serious complications exist. The most frequent serious complication we encounter is retrobulbar optic neuritis. In such cases nothing, as a rule, is found in the sinuses. So that this method would not be applicable. There we find nothing to wash out.

Furthermore, we know that we frequently see patients who have been operated upon very well, where the anterior wall has been fairly well removed and yet they have sphenoidal symptoms, so that the sphenoidal sinuses must be washed out frequently. Repeated punctures would avail us much less in such cases.

DR. H. A. GOALWIN, referring to the X-ray examination of the sphenoids prior to this procedure, said that, being connected with an eye hospital, the cases of sphenoiditis that he sees usually suffer from the sequelae of the disease, particularly retrobulbar neuritis. Pains must be taken to measure up the sphenoids before referring them for further examination by the rhinologist. In many instances it is difficult to gain the cooperation of the rhinologist, for many rhinologists expect to find some discharge before they will operate. Dr. Goalwin said he had brought the roentgenograms of two cases to the meeting, to demonstrate the method of examination. The first was a case of right retrobulbar

neuritis for which the right sphenoid had been operated. Not only was there no improvement in the right eye, but the left eye began to be involved. The patient came to Dr. M. J. Schoenberg, who referred her to Dr. Goalwin for X-ray examination. The roentgenograms showed, in the top view, that the left sphenoidal sinus was L-shaped and extended behind the right sphenoidal sinus, reaching to the right optic canal. He introduced a probe into the right sphenoid and made roentgenograms (lateral and axial) showing the probe *in situ*, to further demonstrate the anatomical variation. Under treatment of the left sphenoid by Dr. MacKenty the ocular symptoms subsided in both eyes.

The second case could easily be mistaken for a left sphenoiditis. The clouding is, however, due to compression of the left sphenoid by a tumor of the pituitary, unilateral. The patient had a right homonymous hemianopsia.

Dr. Goalwin then demonstrated a sketch showing the calculated distances from the anterior nasal spine of anterior and posterior walls of each sphenoid (right and left). The actual measurements as found from the roentgenogram cannot be used, as they are 15-25 per cent too great. Even if we take the distance from the anterior nasal spine to the posterior sphenoidal wall as 8 c.m., it can be readily seen that 15 to 25 per cent beyond that would bring us into rather important structures.

Dr. VOISLAWSKY said that the subject was a most interesting one, and that it was a pity that it should be discussed when so many cases were presented. It was well entitled to an evening by itself, and he would endeavor to have it presented again.

Dr. LOBELL (closing) said that the gentleman who thought that the size of the vertical pin was not of sufficient protection, missed his statement, that he intends to increase the upper extension about 2 m.m. This will serve two purposes. Firstly, it will aid in the prevention of the needle from going beyond the stop, and secondly, it will prevent the operator from entering the anterior wall too near the roof of the sinus.

About the objection to the 9 m.m. projection, he wished to reiterate that 8 m.m. was ordered, but the mechanic made it 9 m.m. However, it is important to emphasize that even 9 m.m. is not too long. When the needle passes through the wall, part of it becomes concealed within the wall, resulting in shortening of the projection.

Next, the question of therapeutics and diagnosis. He did not claim that this was a substitute for surgery; it was no substitute for other treatment. It is for this reason that he called attention to the analogy between the antrum and the sphenoidal sinus. The progress attained in the antrum is largely due to the fact that when a patient comes complaining of pain in the cheek, one does not hesitate to insert a needle into the antrum. Early diagnosis means an opportunity to treat the condition when it is confined to the mucous membrane; there is no mistake about that. There is no claim made that irrigation of the sphenoidal sinus would cure an optic nerve involvement.

Another gentleman asked, "In how many cases was pus found?" Of course, this work was purely experimental and the number is too small to be of statistical value. Nevertheless, it is interesting to know that in two cases the contents of the sinuses were abnormal.

Dr. Lobell then expressed his appreciation and gratitude to Drs. John E. MacKenty, Arthur S. Wilson and F. M. Law, for the privileges of using their departments and for their valuable suggestions.

Lipoma of the Pharynx. Dr. Frank R. Herriman.

(To be published in a subsequent issue of THE LARYNGSCOPE.)

DISCUSSION.

Dr. G. M. PHELPS said he had seen one case on the lateral wall just below the tonsil, as big as an olive; it hung down, and when the patient would cough it would fall on the tongue and then fall back.

Dr. LOREE said that last year he had presented a case for diagnosis and suggestions, viz., a large mass in the throat coming as far forward as

the hard palate. Subsequently the case was operated upon and found to be a teratoma; that case might be interesting in this connection, as a tumor of the pharynx.

Dr. MEYERSON told of one of Dr. Arrowsmith's patients, a lady, age 25 years, with a lipoma of the throat springing from the left pyriform fossa. It was proportionately large; the size of a small apple, and was interfering with her speech and swallowing. Dr. Arrowsmith removed it very readily by means of direct laryngoscopy and the use of a snare.

Unusual Case of Paget's Disease, with Otosclerosis (Slide Demonstration. Dr. L. T. LeWald.

This man, age 29 years, who was referred to me by Dr. C. B. Craig, of the Neurological Institute, presents a most atypical case of Paget's disease, with extreme changes in the skull, obliteration of the sphenoid sinuses, and otosclerosis with deafness in both ears. The case is of great interest because of the radiographic findings. The radiographs show remarkable areas of diminished density.

There is bone of normal density in the frontal area and below an area of diminished density. The side view of the skull shows a similar involvement of the parietal and occipital bones, as well as the frontal and temporal, with this diminished density on each side, but in addition a thickening of bone such as is seen in Paget's disease over other portions of the skull. There is a marked filling in of the sphenoid regions and thickening of the temporal bone on each side.

A diagnosis of Paget's disease would rest on some of the other bones, and in a few cases of Paget's disease there has been a sclerosis of such nature as to involve some of the special organs, such as hearing, and this is apparently one of these cases. The man's general health is good.

Query by Dr. MacKENTY: What is he complaining of?

Answer: Deafness, dizziness and headache. In view of the X-ray findings, one might expect a progressive lesion of the cranium, but nothing of the kind is found. In the pelvic bones are similar rarefied areas, such as we see in Paget's disease, combined with areas of increased density.

Keratosis of the Cord. Dr. David Jones.

J. G., age 59 years, a Russian living in this country for twenty-five years, a pants-maker, eight years ago suffered for about three weeks from hoarseness of the throat and was operated upon for some trouble in the throat, after which the hoarseness cleared up and did not return until July, 1924, when he noticed that his voice was gradually becoming more and more husky; he complains of no pain in talking or eating.

The Wassermann and tuberculin tests are negative, and the physical examination of the chest is negative except for a slight emphysema of both lungs. Examination of the nose shows a slight deviation to the left low down, and the membranes are pale and slightly dry. The lips and hard palate have a number of naevi areas. The tongue is coated; the lingual tonsil is present, the tonsils are submerged. The pharynx shows no evidence of atrophic condition; the epiglottis is pale but shows no swelling.

Examination on May 11, 1925, showed the right cord pale and covered with small areas as if small pieces of white blotting paper had been stuck on; very slight involvement of the left cord (now the appearance of the right is more as if these areas have coalesced, and the involvement of the left cord is more marked). There was webbing of the anterior end of both cords, and now there is considerable bowing of the right cord, which does not meet the left on phonation, and there is thickening in the inter-arytenoid space.

On the 19th of May, a biopsy from the right cord—6x4 m.m.—showed a hypertrophied stratified squamous epithelium with marked keratosis and thickening of the superficial layers. The deeper layers showed long papillae, with a definite lining membrane. A few cells showed hyperplasia. The stroma showed dense lymphocytic infiltration. The diagnosis was "hypertrophied surface epithelium — hyperkeratosis." The

pathologist remarked that while there were then no definite indications of malignancy, the case should be followed up by frequent observations.

On Aug. 17, 1925, another specimen was examined, with the following report: The specimen consists of several small, irregular fragments of firm tissue. Sections show a marked carnification of the stratified mucosa with some papillary hyperplasia. The sub-epithelial tissue shows considerable inflammatory reaction: Diagnosis—hyperkeratosis of mucous membrane.

Another specimen was taken and reported on Oct. 2, 1925: The specimen consists of several very small fragments of soft tissue. Sections show some thickening of the surface mucosa, with marked edema and inflammation of the submucosa. Diagnosis: Inflammatory polypoid tissue.

On May 11, 1925, a 200 mgm. radium pack was applied to the right side of the neck for two spaces, 2800 mgm. hours.

Aug. 12, 1925, the patient had 230 mgm. radium pack for two spaces, 9 hours.

Oct. 25, 1925, 30 mgm. radium needles were inserted for 2½ hours, 45 mgm. hours.

In Logan Turner's book, he states: "The appearances observed are of a patch or patches, chalky or snowy-white in color, with a rough surface presenting frequently a number of spicules. They are generally situated on one or both cords. On microscopic examination the tissue is found to consist of layers of cornified epithelium, underlying which are columnar-shaped and squamous epithelial cells."

Dr. LEDERMAN said that these laryngeal cases are very important. A patient wants an opinion as to whether his case is of a serious nature, and it is not always easy to give a decided answer. He then referred to a patient of his where it was very difficult to decide whether or not the growth was benign or malignant. The patient gave a history of having had hoarseness for some time, without any pain. He had consulted two or three laryngologists before coming to Dr. Lederman, and they had advised a laryngectomy. The physical aspect of the growth did not seem to be of a malignant nature, so Dr. Lederman advised having a specimen of the growth taken for examination and the man should be prepared to have a radical operation done if found necessary. The patient gave a further history of having had a sore on his penis twenty or twenty-five years earlier, but had no symptoms since, and his Wassermann test was negative. Nevertheless, not feeling sure of the condition, Dr. Lederman decided to make a therapeutic test, and after a course of iodid treatment the growth disappeared entirely and never returned.

Everyone knows of such possibilities, and sometimes a condition may exist for years without any malignant change, and then show signs of a most serious nature.

Dr. LOREE said he had seen the case and considered it potentially a malignant growth, and that the treatment indicated was a thyrotomy, or perhaps a complete laryngectomy. Sometimes we are too busy with these tumors of the larynx; if a growth is potentially malignant, it should be removed immediately.

If a thyrotomy is performed, the Clerf saw should be used in order that part of the tissue from the uninvolved area may be dissected off together with the involved side.

Dr. LEDERMAN, as a practical observation, told of a friend, age 60 years, who for a period of two years had suffered from a slight hoarseness, due to a growth on the posterior third of the right vocal cord which was localized, white in color, and to the eye did not indicate malignancy. He was in good general health and had no adenopathy. About a year ago he was advised to have a piece removed for examination. He held a very important place in the community and used his voice a great deal, and finally decided to have a piece removed. The microscope revealed a squamous carcinoma, but without much involvement of the laryngeal tissues, so far as could be detected. The patient was a very intelligent man, and after due deliberation and other opinions, decided to have a

laryngectomy without delay in spite of the fact that he was in apparent good health and without any pain. In fact, on the last examination, two weeks ago, his larynx seemed in better condition than it was two years previously, and yet microscopic examinations by three very competent men in New York all agreed that he should have a laryngectomy. There was no pain, no external adenopathy—nothing but a little white mass which looked like a fibroma.

Dr. MACPHERSON said that no man who saw this case for the first time would be competent to make a diagnosis; Dr. Jones was much more competent to do so, having studied it. The patient had had radium treatment, which causes reaction, and tonight it had a malignant appearance, but that might be due to the radium treatment.

Dr. VOISLAWSKY asked how long the effect of the radium would last, and upon being told about three weeks, remarked that he thought the patient could wait.

Bilateral Ankylosis of Temporo-Maxillary Articulation, with Radiograms.

Dr. Gouveneur Morris Phelps.

This little girl, age 13 years, was referred from Dr. Harmon Smith's clinic. Four years ago she had a tonsillectomy performed in one of the hospitals, and two days later noticed a stiffness in the jaws, but no pain. This stiffness progressed until she was unable to open her mouth.

Excepting for the tonsillectomy, her past history is negative. A Wassermann examination was negative, and smears and tests for gonorrhea were all negative.

The X-ray examination showed a fibrous ankylosis of the temporo-maxillary articulations. No other joints were involved.

It was decided to operate on the case and the articulation was exposed by an L-incision, the lower limb being parallel to the lower border of the zygoma. The joint could not be identified, as it seemed to be entirely obliterated and there was no motion. The neck was then cut across just below the condyle and above the attachment of the external pterygoid muscle with a chisel and a de Velbiss forceps. The ends of both fragments were smoothed and rounded off, and a piece of the fascis over the temporal muscle was turned down and sutured between them. The skin wound was closed with horsehair.

In operating, great care was exercised to avoid the internal maxillary artery just behind the neck of the mandible, and also the inferior dental nerve.

Motion was permitted on the day following the operation.

DISCUSSION.

Query: Were you able to obtain any history of infection, etc.?

Answer: Apparently not. The child first noticed this stiffness two days after the operation. She had no involvement of any other joint.

Query: What was the anesthesia at the time of the tonsillectomy?

Answer: General.

Dr. JAY D. WHITHAM asked whether an orthodontist had seen the child since the operation, with the idea of correcting the mal-occlusion. He thought that possibly the lower jaw could be brought forward by the use of dental splints and rubber bands, etc.

Dr. PHELPS replied that he had no doubt the condition could be greatly improved and the lower jaw expanded by orthodontia. In all cases of ankylosis of the jaw in children, the lower jaw fails to develop.

Dr. MACKENY inquired whether the condition might not have existed to some extent prior to the tonsillectomy.

Dr. PHELPS, replying to Dr. MacKeny's query, said that the mother of the child stated that the child's chin was normally developed before the ankylosis developed.

Dr. WHITHAM said that recession of the chin is always present when the jaw has been ankylosed for any length of time, but probably an orthodontist might be able to force the jaw forward by rubber bands with little hooks attached to dental splints. A great deal of that kind of work was done during the war.

DR. MACKENTY: It is my opinion that the tonsillectomy had nothing to do with this condition, and that the malformation of the mandible is due to maldevelopment. She has a very peculiar jaw, and the fact that the mother says that it was right before the tonsillectomy should not carry any weight. That the ankylosis came on after the tonsillectomy is a coincidence.

DR. VOISLAWSKY agreed with Dr. MacKenty that the condition of the jaw was developmental. Orthodontia would put the teeth in line, but would not give any further opening of the jaws.

DR. PHELPS said that the tonsils had been removed and when he first saw the child she could only put the end of a tongue depressor between the teeth. He had pried it so hard that he pried out one of the incisors, and that was done under an anesthetic, for he had thought it was a fibrous ankylosis and it might be possible to spread it. No one living could have taken the tonsils out of the mouth as he first saw it. He had seen other cases and they all had that maldevelopment of the lower jaw. He had thought it might be possible to split the lower jaw and widen or open it out and put in a piece of tibia or a piece of rib.

DR. J. D. WHITHAM said that the operation had been done on a similar case by Dr. W. T. Coughlin, of St. Louis. Dr. Coughlin's result in correction of the deformity and restoring the occlusion of the teeth, as reported in the *J. A. M. A.* last February, is remarkable. His technique consisted of severing the mandible in the middle line and premolar region and, by intradental wiring of the resulting movable fragments to the upper jaw, correcting the deformity. At a later date he inserted a bone graft in the midline.

SECTION ON OTOLGY.

November 5, 1925.

Practical Demonstration of Modern Pedagogic Methods in the Training of the Deaf Child, by Teachers and Pupils of the Central Institute for the Deaf, St. Louis. Dr. Max Goldstein.

DISCUSSION.

PROF. DR. F. R. NAGER (Zurich University): Mr. Chairman, Ladies and Gentlemen: I thank you very much for the honor you have given me of opening the discussion, and I thank you especially that I have the opportunity of presenting my thanks to Dr. Goldstein for his most wonderful demonstration of the training of deaf mutes. During the time I spent with Professor Bezold in Munich, we tried to examine all our deaf mutes with tuning forks. You see the progress made with these attempts; it takes much less time, and probably the results are excellent. I don't know, because we have not learned the complete examination. However, in our country we do much anatomical work, and several weeks ago I had the honor to present in this room some of our slides; but today I am very much more impressed with the beautiful results demonstrated this evening. Dr. Goldstein was very fortunate in picking out these deaf mutes, one group of which consists of congenitally deaf mutes. In our country we have more of the acquired form, totally deaf, and the deaf mutes with a mental defect, so that of course education is much more difficult; but I am very much impressed with these acoustic methods, and I think it is a proof of the experience we get that an individual treatment will have a beautiful success, and it proves again the value of the excellent combination of eminent otologists with the excellent staff of Dr. Goldstein, for which I should like to express my congratulations. This good combination gives such beautiful results that I am very much impressed, and it is one of the best souvenirs I take home with me. Will try to do some of this work in our own country. I think that Dr. Goldstein will have the same help in future, as we are all deeply impressed by this demonstration. I thank you.

DR. WENDELL C. PHILLIPS: After Dr. Goldstein's talk and demonstration of this work it would be useless for any man who has given any prolonged study of the subject, with its many variations, to attempt to discuss all the points. I have visited Dr. Goldstein's school and know of his work, and I know how unique it has been; and his results are beginning to show. These results have encouraged emulation in other portions of the country, and I wish to assure him from my own knowledge that he is making a lasting impression upon the people of this country regarding the particular phase of deafness in which he is interested. He has the good fortune of being able to devote so much of his personal time to the working out of his problems. He richly deserves a crown, and I am sure that when he passes from this mundane sphere the golden gates will open wide for him, even though he approaches those golden gates from St. Louis.

I certainly desire to clear up his mind on one question: I refer to the definite problems of the organizations grouped under the title—The American Federation of Organizations for the Hard of Hearing, made up of speech reading clubs, Leagues for the Hard of Hearing, etc. Dr. Goldstein stated that they are particularly interested in the care of deafened adults, and here I must take issue with him. While the leagues are greatly interested in the rehabilitation, occupations, education, and social welfare of deafened adults, we consider this service more or less as along the line of salvaging humanity. The programs of the Federation are far deeper and more comprehensive. We aim in these organizations eventually to solve the problem of the prevention of deafness by establishing a proper system of hearing tests in all school children. Furthermore, we attempt to draw a fine line of distinction between the congenitally deaf and the acquired types, particularly those where the affected children have normal speech. It is our purpose to insist that wherever possible deafened children with speech are never to be educated with the congenitally deaf, of the type which Dr. Goldstein has presented to you this evening. Up to date, our observations show that the class of children of the type represented by Dr. Goldstein is extremely limited, so far as percentage is concerned; while, on the other hand, the type which we endeavor to discover, to properly educate, and to properly treat in a preventive manner, constitutes a vastly higher percentage of the youthful population. This problem is the one to be undertaken by The American Federation of Organizations for the Hard of Hearing. It requires and calls for great research undertaking; it requires and calls for the standardizing of hearing tests, and methods for the examination of young children. I have gone into this matter at some detail, for I have felt that Dr. Goldstein and others interested in the particular problems of the education and care of congenitally deaf children, together with such deafened as have no speech, do not fully comprehend the real needs, educational and otherwise, of the far more numerous partially deafened children who should never be educated together with the congenitally deaf.

One of the more recent activities of the Federation has been an attempt to standardize methods of testing the hearing of school children on a large scale, and up to date the so-called phonograph audiometer is the latest development. I hesitate to publish any definite statistics as to the percentage of school children whose hearing is below normal. Heretofore, otologists generally contended that about 2 per cent of all children of school age had some hearing defect, but by using the phonograph audiometer in one school in New York City and one other school elsewhere, it would seem that hearing defects involve a far higher percentage of school children. Indeed, so high is the proportion that if future investigation verifies present statistics we shall have cause to enter even more seriously into the amelioration and education of partially deafened children. In one group of partially deafened children, investigated under the auspices of the New York League for the Hard of Hearing, treated in a special clinic, it was found that the majority of a group of about one hundred were unable to keep up with their classes; some

in this group were improved by medical treatment, all were given two hours a week instruction in lip-reading, and after a few months it was found that the majority, as a result of lip-reading experience, were able to keep up with their classes. Our belief is that these moderately deaf children should never be educated in special schools for the deafened. On the other hand, our efforts are being put forth to have certain teachers in public schools trained in lip-reading in order that the partially deafened children in said schools may receive the benefits of lip-reading in conjunction with their regular school work. I have spent considerable time personally, together with other League officers, in an attempt to secure cooperation along this line from those in charge of the public schools in New York City.

When it comes to this marvellous teaching that is being done in Dr. Goldstein's institution, we have only words of praise. These children have the finest tone inflections I have ever heard from any scholars of these types.

I agree with every word that Dr. Goldstein has said about the otologists of this country not giving the time and attention they should to the sociological and educational features of the problem of deafness. Every otologist should associate himself with the local organizations which undertake to render service to deafened people.

DR. HARRIS TAYLOR: Before I enter upon my sincere expression of appreciation and praise of Dr. Goldstein's work, I wish to state that on one point at least he is greatly in error. He said that there are only two schools for the deaf in the United States where training of a reasonably good nature is given. I am broader-minded than he is in this respect, and I fully admit that the school of which I am the head is the peer of the others. In saying this, I wish to say also that I have the highest regard for the work done by Dr. Goldstein in his institute.

Having gotten that out of my system, I wish to say that the happy combination that is found in St. Louis is rarely found. Gillespie, of the Nebraska School for the Deaf, did more to promote auricular training than anyone in his day, but the profession never accepted that work; it failed of effect because it lacked a Goldstein behind it. A man like Gillespie with a man like Dr. Goldstein would have put this work twenty-five years ahead of what it is today. Then comes this combination, and it is a remarkable combination, the most remarkable I have ever heard of—that you can take an enthusiastical medical man and have him give so much attention to an educational institute. Dr. Goldstein is a remarkable man! If I could have men like him in my school and keep them, what a wonderful school it would be—and the same can be said of all the schools in this country. Dr. Goldstein has contributed so much to the profession that he can easily be generous to the others, and it may be that some of the others are not wholly in the doldrums. Someone said that my term of office as President of the American Association to Promote the Teaching of Speech has been remarkable for its masterly inactivity. That may be true. There have been very few new ideas come into this work in the last twenty-five years; Dr. Goldstein has contributed as many of them as anyone in the United States, and we all appreciate what he has been doing. He has not only added his own ideas—given us new things and brought forward old things in a new way—but he has accepted the best already in existence and put it in good form, and continued it in a good way; he has held on to all that is good, and has at the same time contributed much that was new. You don't see that combination often in a lifetime. If a person is contributing much that is new, he is often unwilling to accept much that is good and hold to it. When you see a man who can utilize existing agencies, he does not usually have the ability to do pioneer work. The Central Institute is a very good school, and we are very grateful to its founder, Dr. Goldstein.

MRS. EDWARD B. NITCHIE: It is a particular privilege to me tonight to be able to say a word about Dr. Goldstein's work, for I know it personally. I spent four weeks, a year ago, in taking a post-graduate course

in the Central Institute for the Deaf. During that time I lived with the teachers and with the children, and was able to see them each day as they spoke in the school, not as they speak on the platform. That was what I have always wanted, to hear the speech of deaf children in their daily living. They may be able to make a fair demonstration, but their everyday speech may not be so acceptable as we would like to have it. I found that the daily speech of the children from Central Institute was far more pleasing than any I have heard, but that may be because I have not heard the children in other schools. Their work was remarkable. I notice tonight that little Marie has improved very much in over a year.

No one has spoken tonight of the work of Merle. When I was taking this course there was one girl of sixteen who had been trained for only one year. At fifteen, she had been given no speech whatever—had only the sign language and the manual alphabet; she had been classed as unfit for oral training. I sat at table with her for four weeks and at all times her speech was intelligible; not pleasing, but intelligible.

I was very much impressed with the training that Dr. Goldstein and his assistants were giving in St. Louis. I would not care to talk tonight on the organ of Corti, but I have made a study of it under Dr. Goldstein. I have felt in my own work that the training which I received in Central Institute has been of great value to me, for so much of this training can be applied to our own hard of hearing pupils.

PROF. JOHN D. WRIGHT (Founder and Director of the Wright Oral School for the Deaf) was called from the floor when Dr. Wendell C. Phillips stated that Mr. Wright had just returned from a four years' tour of the world.

While dining with Dr. Phillips this evening he asked me whether I had given up my interest in this work and I replied that I could give him definite proof that I had not, for while abroad I had made a point of visiting every school for the deaf that I came anywhere near. Indeed, my wife says I spent more time in schools for the deaf than I did in seeing the Pyramids, the Taj Mahal and other great world-famous sights.

While in Ahmedabad, in Central India, I hunted up, with difficulty, the little school for the deaf. When I inquired of the hotel proprietor he said there was none, but referred me to a guide, who told me that not long ago another American gentleman had made the same request and so now he, the guide, knew where the school was. I was interested to discover that that other man was Dr. John Weeks, of this city. It is very pleasing to find that some otologists are also interested in our educational problems.

I have probably seen more schools for the deaf in all parts of the world than any other man ever saw and I assure you that you will never see anything outside the United States that will compare with what Dr. Goldstein has shown you tonight, and it is not often that you will see it even here. It is a great satisfaction to anyone who, like myself, has given up nearly forty years to the work of orally educating the deaf to find a man who, like Dr. Goldstein, is willing to give up his time, his effort and his money to this work. It is one of the most fortunate things that has ever happened to the cause for which we others are giving up our lives, and I congratulate the deaf on the work Dr. Goldstein is doing for them.

THE PHILADELPHIA LARYNGOLOGICAL SOCIETY.

November 6, 1925.

The More Recent Otological Problems (Abstract) (With Lantern Slide Demonstration). Prof. F. R. Nager.

Until recently the pathological problems of the ear were neglected. This may be ascribed to the difficulty in the microscopic technique, which was not successful until the decalcination and celloidin imbedding was perfected.

It is also problematical and difficult to obtain human specimens without disturbing the pyramids or to prevent the escape of the peri and endolymph.

In recent years we have learned that we must reckon with the post-mortal changes due to decomposition and disintegration from that caused by the disease and actual pathological changes in the ear.

The histological pathology of the middle ear is easier to interpret, and since this has been accomplished many problems have been cleared up.

Normally in the fetal organ the mucous membrane is cylindric and rests upon a myxomatous filling tissue. In the adult the cells become flatter and appear as though they rest directly upon the bone. In fact they assume more of the endothelial type of cell. When inflammation occurs, there is a reversion in the cytological metoplasia to the embryonic state.

Pneumatization of the mastoid is dependent upon healthy mucous membrane. All irregularities in the cellular distribution is sequential either to aspiration of amniotic fluid or foreign body formations secondary to epithelial desquamation and infection.

In all acute exanthemata there is involvement of the nasal and sinus mucous membrane. The inflammation may also reach the mucous membrane of the mastoid cells without being visible to otoscopic examination. When doubtful symptoms appear, latent otitis media and atypical mastoiditis may be suspected.

T. B. otitis media occurs frequently during childhood and should be treated accordingly.

Malignant chronic suppurative otitis media with its tendency to extend to the labyrinth or intracranial fossa is of extreme importance.

There is also a relationship between the epithelization from the ulcerated mucous membrane of the external auditory meatus and the genesis of cholesteatoma.

A note of warning is to watch that the drainage is not impaired by the desquamated epithelium. Should this occur, then, syringing with a

special attic canula is necessary, otherwise a radical mastoid operation may be resorted to.

The cholesteatoma matrix must be treated with care as it is nature's method of epidermatization and aids convalescence.

The labyrinth capsule always exhibits embryonic parts and at birth it is almost of adult size.

Otosclerosis is primarily a bilateral constitutional disease, referable to a congenital or hereditary disposition and occurs during puberty, pregnancy or puerperium and is independent of middle ear disease.

The histopathology is as follows: Normal bone is absorbed and replaced by unripe osteoid tissues, which again changes into the lamellar bone; it is then that the process comes to a stand-still.

Acoustic trauma: Degenerative atrophy of the neuro-epithelium is first found in the organ of Corti and later it affects the spiral ganglion, especially around the basil coil. The Helmholtz theory was corroborated by Witmaack and Siebenmann, that loud continuous tones or noises would cause definite destruction at given spots.

It was also proven that acoustic trauma is conveyed through the air-conducting apparatus and can be eliminated by the removal of the incus or by hermetic closure of the external auditory meatus; thus, the shock is muffled to the labyrinth.

DISCUSSION.

DR. GEORGE M. COATES said that the slides presented by Prof. Nager were most concise, clear and readily understood, he having overcome many difficulties in regard to the technique of cutting these sections so that the cuts were mostly made in the same plane and it was not difficult for the observer to orientate himself. It is particularly difficult sometimes to interpret actual pathological changes in the delicate neuro-epithelium. Post-mortem changes occur very rapidly in this tissue and artifacts are very common and often misleading.

The slides showing destruction of certain points in the cochlea corresponding to certain sounds to which the animal had been subjected were most interesting and convincing and substantiate Helmholtz's theory.

The relationship between latent otitis media and mastoiditis, and general internal medicine or focal infections has recently been carefully studied by some of the Pediatricists, notably Jeans, of the University of Iowa. The whole subject of latent infection is being more closely studied as these conditions probably account for some hitherto unexplained infections.

Exanthemata undoubtedly play an important role in middle ear disease. The mucous membrane of the Eustachian tube and middle ear is involved coincidentally with the mucous membrane of the nose and throat at the very beginning of the disease. This is simply the mucous membrane manifestation of the rash that is seen on the skin. This does not constitute ear disease, but it does prepare a fertile field for secondary infection, which not infrequently follows.

Cholesteatoma is nature's attempt at curing chronic suppurative otitis media by lining the suppurating cavity with epithelium. Dr. Nager has suggested that in operating upon this condition, the delicate matrix should not be removed as it makes a much more satisfactory lining for the cavity than any plastic flap operation.

Dr. Nager has illustrated by means of his slides what effect certain noises have upon the end organs in the cochlea. In this present-day life, everyone is exposed to an increasing amount of noise, whether it be street-cars, trucks, automobiles, building construction or what not. It would seem probable that some action would have to be taken to preserve the organs of hearing from the menace of all these concussions and that is a problem for the otological profession to work up.

DR. RALPH BUTLER: We have enjoyed Prof. Nager's presentation very much.

In this country it is difficult to obtain autopsies and this discourages the study of histological pathology.

The slide demonstration of the destruction of the organ of Corti by various noises was very clear and leaves no doubt in regard to the location of the areas affected by different noises. This demonstration helps to substantiate the Helmholtz theory. The experiment showing that the labyrinth may be protected from the deleterious effects of loud noises by the removal of the incus is very interesting. Of course it cannot be practiced on human beings. No doubt purulent otitis media protects the labyrinth in the same way by lessening the conductivity of the middle ear.

I want to emphasize Prof. Nager's plea for a more universal study of the pathology of the ear. This is most important and I hope that our younger Otologists, who have more time now than they will later, will give it more attention.

DR. MACKENZIE: I have not the ability nor the grace to pay compliments, but I can truthfully say that you, Prof. Nager, have received the most cordial greeting and generous applause of any guest the Philadelphia Laryngological Society has ever had. We were all intensely interested in your excellent lecture and demonstration. Careful technique in the collecting of material for pathologic study is always important. I recall the care that Prof. Stoerk, of Vienna, took in collecting temporal bones for pathologic study. He insisted on getting the bone from the cadaver within thirty minutes following death; when he would open the labyrinthine capsule immediately to allow the preserving fluids to reach the interior before the least amount of post-mortem fouling could take place. It was the neglect to do this that hindered the earlier investigators in their work.

In the closing discussion I trust that Prof. Nager can find time to tell us something about the pathology of syphilis, a subject which has interested me considerably. My studies have been confined largely to the clinical manifestations of syphilis. For a knowledge of the pathology, I have been forced to depend upon others. In Panse's work on the "Pathologische Anatomie des Ohres," where I first began my book stud-

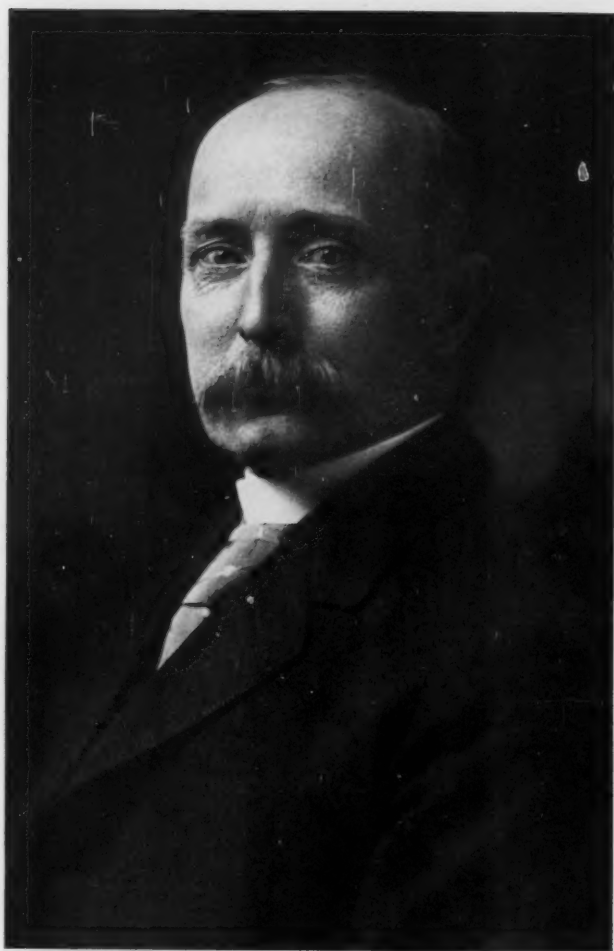
ies of the pathology of syphilis, I found evidences of errors made by the earlier pathologist, because of lack of attention to proper technique in collecting and preserving their material. For instance, Barateux, whom Panse tends to support, mistook such artifacts as post-mortem fouling and red stained clumps of blood platelets from suffocative hemorrhage in the inner ear for *bona fide* pathologic findings of syphilis. These mistakes have since been pointed out by Asai, Mayer and Hofer, who examined microscopically the temporal bones of luetic children. None of these later investigators found changes in the inner ear comparable with that found by the earlier investigators that could be attributed to syphilis. All of which speaks forcefully for careful technique, which the Professor so ably brought to our attention this evening. The pathology of neuritis of the VIII nerve, of acquired syphilitic origin, has been well established by these recent investigators, but not so the pathology of labyrinthitis syphilitica tarda (that condition of the inner ear which causes profound deafness and which contributes one of the so-called Hutchinson's triad). Clinically, we are able to distinguish these two processes by the galvanic test, which is found to be negative in the case of neuritis and positive in the case of labyrinthitis.

I am not yet prepared to accept unqualifiedly Wittmaack's theory of pneumatization of the mastoid and interference with pneumatization, the result of early inflammation of the middle ear. If Wittmaack were entirely right, it would seem that we should find a larger number of complications from middle ear suppuration in the case of the diploetic type of mastoid than in the pneumatic. Then again, in support of Wittmaack's theory, I am reminded of a case presented by Dr. Carmody with lantern slides at the last meeting of the American Academy of Ophthalmology and Oto-Laryngology, in which a child had normal-sized nasal accessory sinuses on one side and very small on the other. On the side with the small sinuses there was a maxillary empyema present. The affected sinus was drained and treated, with the result that the involved sinus increased rapidly in size, up to the normal; at the same time all the other sinuses on that side did likewise.

Concerning the development of cholesteatoma, I am inclined to believe that perhaps a larger number develop, in consequence of the emigration of the canal epithelium along the hammer handle to the tympanic cavity, than by extension along any other route. There are two findings which support this belief: First, the majority, if not all, of the cholesteatomas that I have observed are located in the antrum or attic-antrum region; secondly, the most, if not all, the ears in which I have found a cholesteatoma, the tip or remnant of the tip of the hammer handle was found imbedded in thickened tissue of the inner wall of the tympanic cavity.

The specimens of otosclerosis shown by Prof. Nager are very interesting, particularly those in which plaques were found in and about the internal auditory canal. They recall some similar specimens shown by Siebermann at Boston in 1912, during the Ninth International Otological Congress. It was the memory of these specimens which prompted me to be on the lookout for atypical functional hearing test findings in cases of otosclerosis. I have been rewarded a few times by finding cases of otosclerosis, in which the complexion of the findings were of the mixed types of deafness, with the tendency to the perceptive type deafness more pronounced than the obstructive.

It is refreshing to have someone so qualified as Prof. Nager to come here and enlighten us on the pathology of the ear, a subject so fundamentally important to the understanding of all otologic problems.



J. B. Shapleigh



IN MEMORIAM.

Doctor John Blasdel Shapleigh.

John Blasdel Shapleigh was born in St. Louis, Missouri, October 31, 1857. He received his education at Washington University, graduating with the degree of B.A. in 1878. He entered the study of medicine, graduating from the St. Louis Medical College in 1881. After serving as assistant physician in the City Hospital, he went to Vienna for post-graduate work in Otology. He returned to St. Louis in 1885 and devoted himself exclusively to the practice of Otology since.

In 1886 he was married to Miss Anna T. Merritt. There were two children of this union, a daughter, Margaret, and a son, Blasdel. Dr. Shapleigh died September 15, 1925, after a short illness.

A native son of St. Louis, identified with a family which, for several generations, has been recognized for its civic activities, social prominence and philanthropic spirit, Dr. John Blasdel Shapleigh contributed his share modestly, effectively and consistently to the upbuilding of this city and especially to its medical educational development.

He was prominently identified with the creation of the Medical School of Washington University, was a member of the Medical Faculty since 1885, and its Dean, 1901-1902. He created and occupied the Chair of Otology in the St. Louis Medical College and later in Washington University Medical School from 1885 to 1925, giving this service as a clinical teacher in his chosen specialty with a dignity, a quiet intelligence and a substantial and consistent scientific background.

In 1890, he was elected to membership in the American Otological Society, holding this membership throughout his long and active professional career. He was President of the Medical Society of the City Hospital Alumni, a prominent member of the St. Louis Medical Society, and Fellow of the American College of Surgeons.

In June, 1925, he received the Honorary Degree of Doctor of Science from Washington University as a recognition of sixty years of devotion and unswerving loyalty to his Alma Mater.

In addition to his professional activities as a teacher and member of the Faculty of Washington University Medical School, he was Otologist to St. Luke's, St. Louis Children's, and Barnes Hospitals, Washington University Dispensary; Consulting Aurist, Barnard Free Skin and Cancer Hospital.

In his personality he had all of the distinguishable attributes of the well-bred gentleman,—innately refined, the soul of honor, unostentatious in dress, speech and demeanor, direct in his form of

address, frank and fearless in the expression of his opinion, fair and deliberate in judgment, loyal to his friends and associates, and above all, extremely conscientious in the performance of any task or duty which he undertook.

Characteristic of the nature and spirit of this man was a special bequest in his will to be used in the payment of tuition of worthy students in the Medical School of Washington University. His was the real helping-hand and sympathetic heart, contributing quietly, kindly, intelligently and generously to the uplift of others.

In his death the medical profession has lost an upstanding, dignified and wholesome representative; his otological confreres, at home and abroad, will miss his wise and friendly council and his earnest effort to uphold every genuine evidence of scientific progress and medical practice; his friends will be deprived of his force of example, his loyal support in science, in civis and in philanthropy; finally, the greatest loss and keenest bereavement will be felt in his own family circle, for it was here that his finer qualities and his kindly spirit must always have been most in evidence. For he was essentially a man who loved his home and fireside and to this inner circle we would especially offer our sympathy.

Announcement has recently been made that the Auditorium to be erected in connection with the new St. Louis Medical Society building will be a memorial to Dr. John Blasdel Shapleigh.

M. A. G.

Dr. Shapleigh's contributions to the literature of Otology were not numerous, but were uniformly qualified by common-sense and a clean-cut analysis of the subject matter that he presented.

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